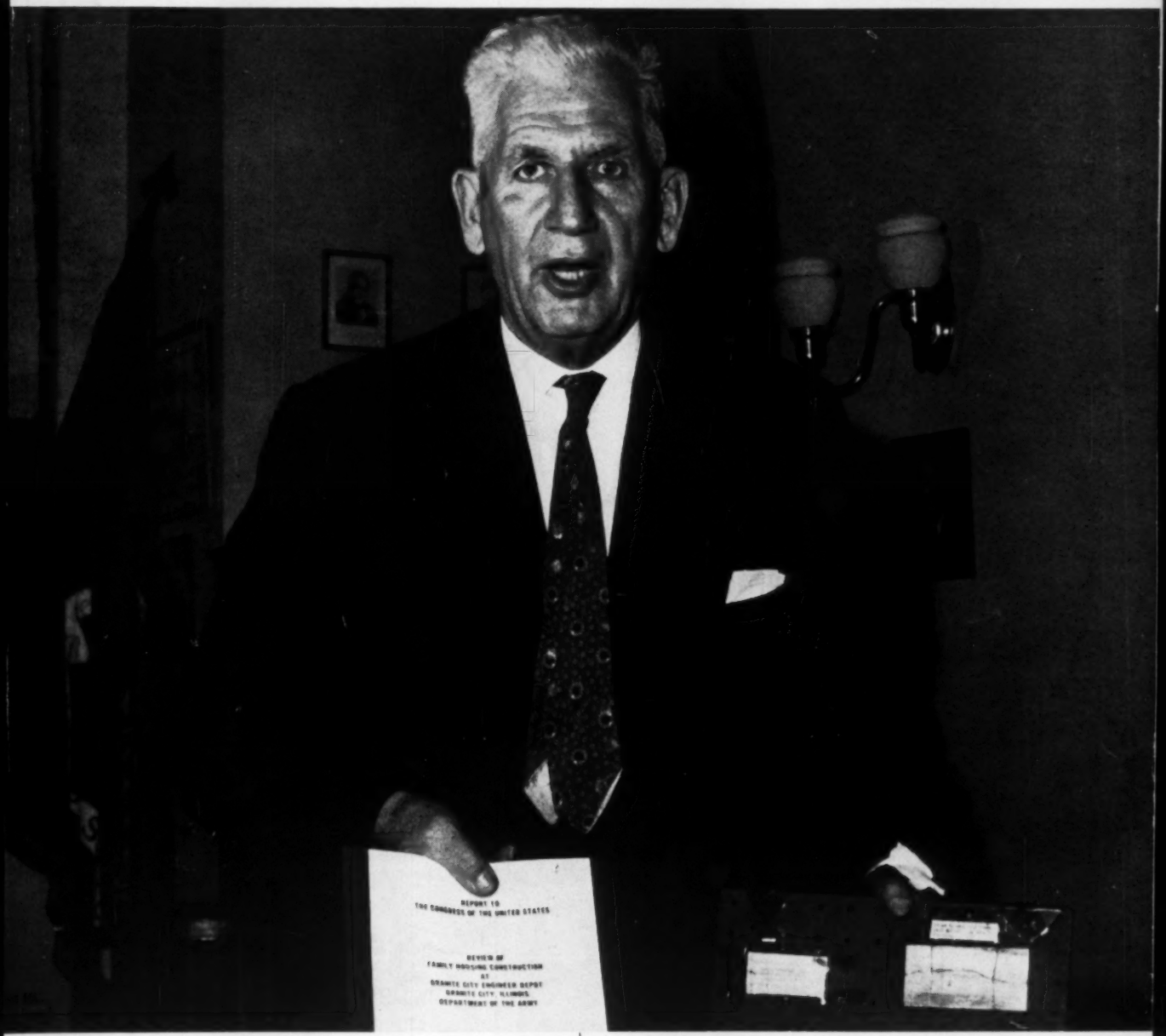
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication FEBRUARY 16, 1961



★ Sen. Paul Douglas Leads:

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New Depreciation Developments p. 80

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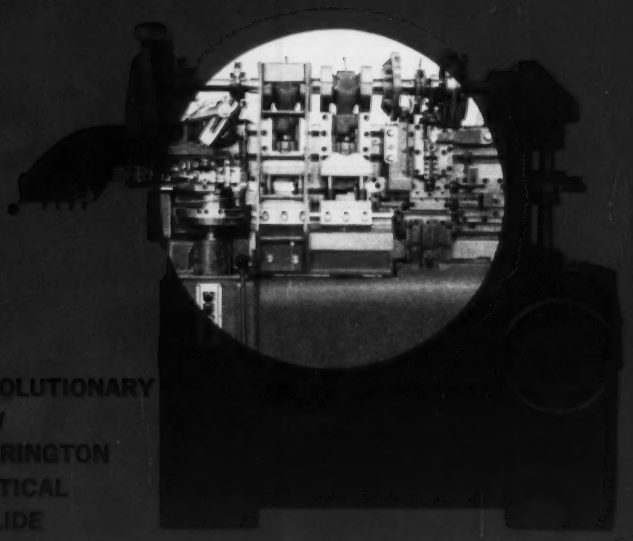

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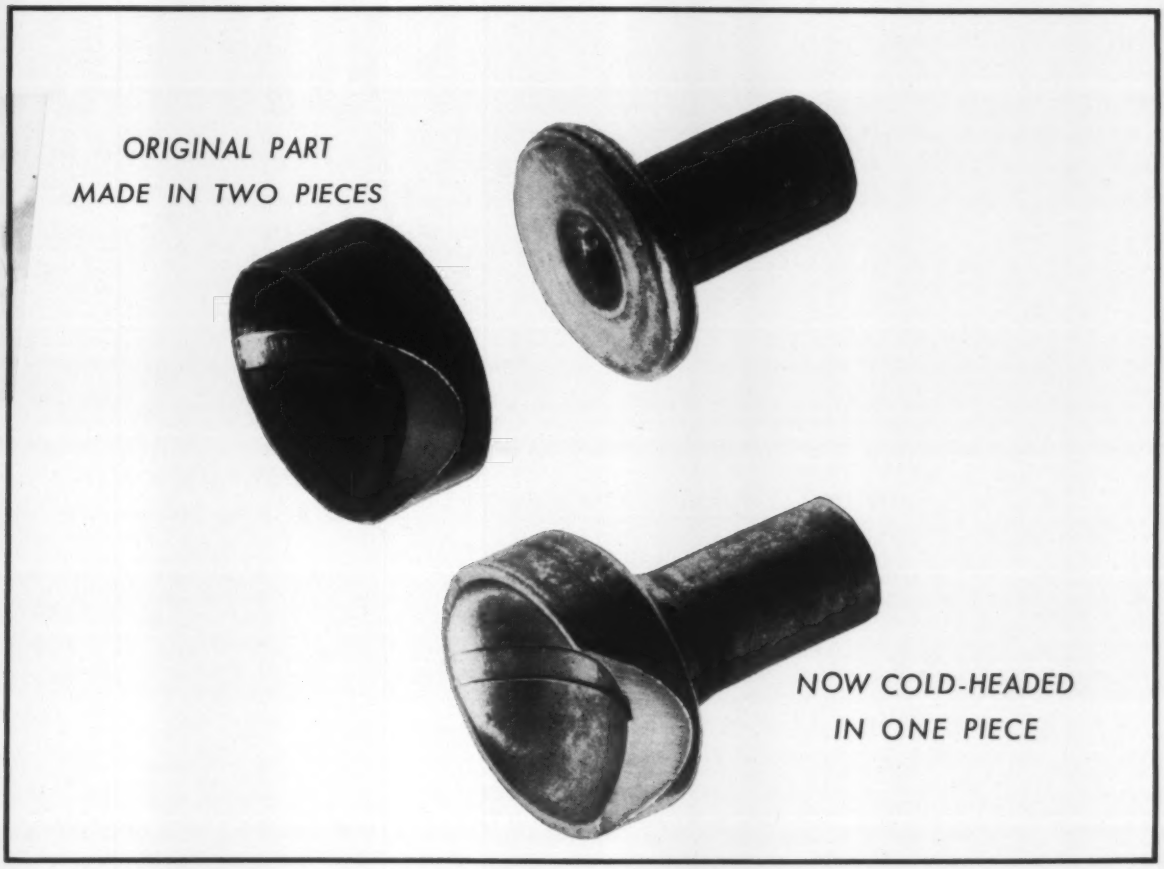

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The IRON AGE

February 16, 1961—Vol. 187, No. 7

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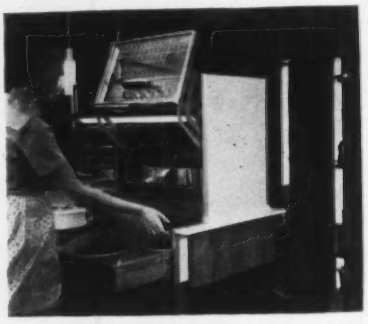
News of the Industry

APPLIANCE RECOVERY?

Cost-Cutting Is Key—After suffering a dropoff in sales last year,



the appliance industry now predicts a slight rise. Cost-cutting, however, spells problems for industry's vendors. P. 76

ENGINEERS' SALARIES

Keep Moving Up—Between 1958 and 1960 salaries paid engineers rose by about 5 pct a year, survey shows. Median annual salary for profession now $9600. P. 77

PLANT LOCATION

Advice for Customers — Steel companies are giving customers an added service: Valued advice in locating new plant sites. Two steelmakers have separate departments to guide users. P. 78

DEPRECIATION

What's Ahead? — Stronger enforcement of present tax laws may

Metalworking

Cover Feature

MILITARY WASTE — Sen. Paul H. Douglas of Illinois points out waste and duplication in military buying. He's leading the fight for greater efficiency in defense procurement. P. 73

mean industry will have to take a closer look at the depreciation allowance. No new tax doctrines are pending, but the present one will probably become more strictly enforced. P. 80

MAGNETIC BOOST

Compound Development — Bell Telephone Labs have come up with a new compound which boosts magnetic potential. Applications are envisioned in several areas including communications. P. 81

Engineering-Production Developments

BOOST THE EFFICIENCY

Of Supervisory Personnel—How can you get more and better work from executives and supervisors? Use direct rewards in regular-salary checks to keep top men on their toes. Year-end bonuses are fine; but they're often forgotten in week-to-week working efforts. P. 103

REPAIR-FREE WELDS

For Power Reactor — Perfect welds are a must in fabricating power reactors. There are no chances for repairs once these units start up. Mig welding met this challenge on Canada's first natural uranium power reactor. P. 106

SEMI-PERMANENT MOLDS

Cast V-8 Blocks—Developing a lightweight V-8 auto engine hasn't been a cut and dried affair. Many new ideas add to the successful use of a semi-permanent mold process. End result: New aluminum blocks with gray-iron cylinder liners. Each of these new blocks weigh only 76 lb. P. 108

AVOID FATIGUE FAILURES

Use Fail-Safe Approach — Metal fatigue is sometimes hard to avoid. But there are ways to reduce extensive failures in aircraft. This same approach can be applied to many other industries. P. 111

AUTOMATED TORCHES

Cut Hot and Cold Slabs—Flame-cutting units have found their places in German steel mills. One completely automated setup transforms huge slabs into cut-to-length pieces. Rate of production is 248 steel blocks per hour. P. 114

Market and Price Trends

PLASTICS

Boom Ahead — New highs are predicted for the plastics industry in 1961. Sales are seen jumping 5-10 pct and reinforced plastics, which slumped 3 pct in 1960, are expected to join the boom. P. 79

AUTOMOTIVE

New Engine — Ford Motor Co. hopes to introduce its "little" V-8 engine by fall. The engine is designed for 115 in. wheelbase cars specifically. P. 89

WEST COAST

Building Boom—Extensive building programs have been scheduled by West Coast companies for 1961. Million of dollars will go for new plants and for additions to existing facilities. P. 91

STEEL SUMMARY

Little Change—The steel market may show brief gains in February and March. But the overall pattern does not show a major improvement until the second quarter. P. 131

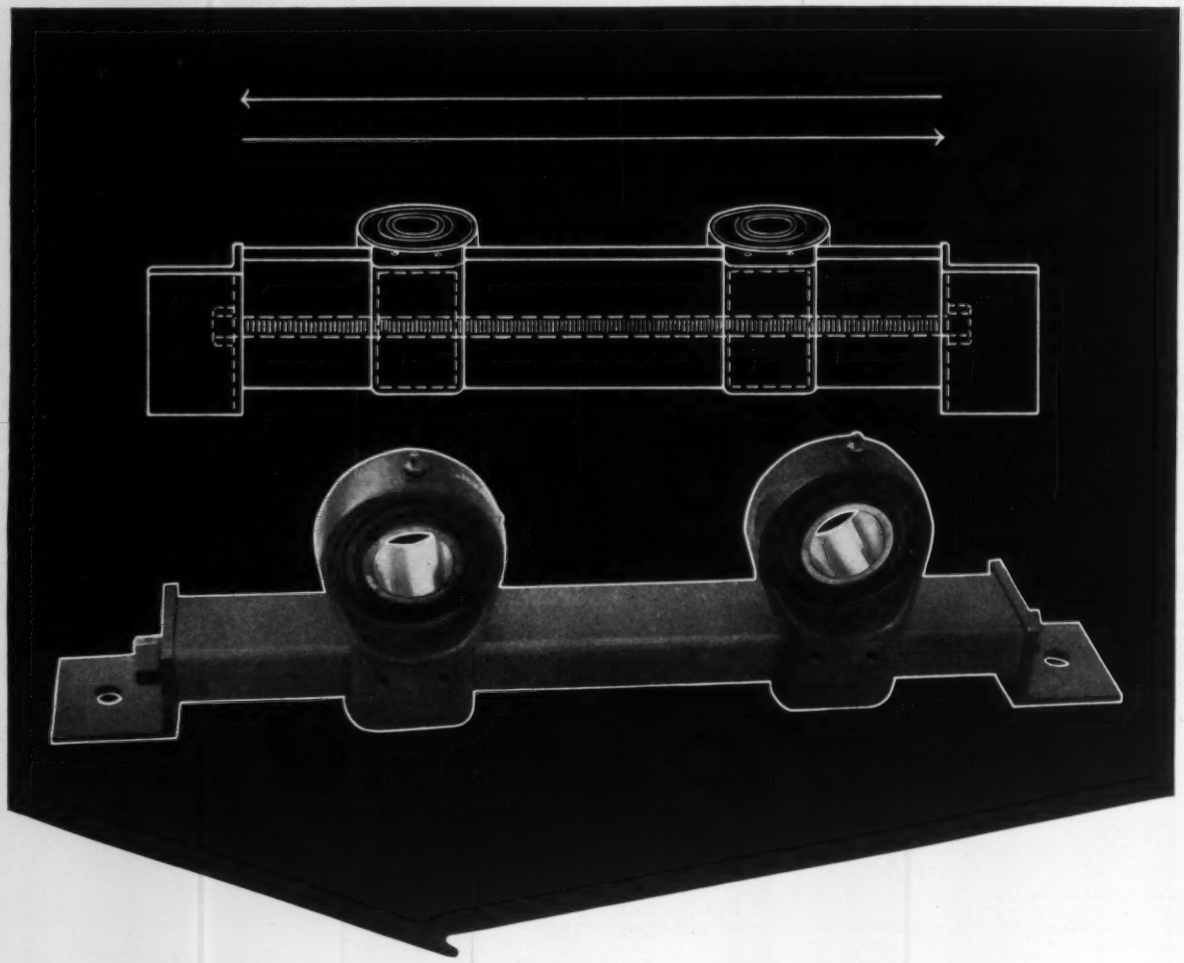
PURCHASING

Platers Hurt — Plating industry and plating suppliers, like many industries, are recession struck. P. 132

NEXT WEEK

TRENDS IN PLASTICS

More Functional Jobs — The metalworking industry should study new developments in plastics. Current plastic trends point to harmony with metals. Next week's report tells how plastics are serving many functional applications.



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Double Standards: They Can Cause Anguish

The Government's case against some of the largest makers of heavy electrical equipment—and their officers—has ended in fines, jail sentences, and probations.

Outstanding citizens have paid fines. Some have gone to prison for their actions. Others have received suspended sentences. Companies have been fined and censured.

Company heads have disclaimed responsibility for the price-fixing of their officers or other employees involved. They have backed up this position by citing company orders and policies.

Many of those indicted by the Government pleaded guilty. Others pleaded nolo contendere. But the majority entered guilty pleas, pointing up the fact that they knew what they were doing when they violated the law.

The impact of this unusual case on businessmen and on industrial companies has been shattering. Further, the jail sentences will be a life-long burden on those who are to spend 30 days in prison.

Reference to "organization men", similar price-fixing by government itself, or talking about everything but the case involved settles nothing. The thing is, "Why did these men do what they did when they knew it was illegal?"

The judge dealing out the sentences blamed much of the illegal action on corporate policies. He bore down hard on high officials and brushed off suggestions that they knew nothing of the actions of their subordinates.

He said that a great number of the defendants were torn between conscience and an "approved corporate policy;" that promise of better living, higher salaries and position was balm for conscience. Corporate representatives denied this picture of their part in the case.

The question remains: "How could upright, solid citizens, with families, community positions of trust, and a professed religious attitude be involved so deeply in violation of the Federal laws?" This isn't easily answered.

Is it too simple to say one can't have two standards; one for corporate actions and one for personal behavior?

A double standard can cause deep and lasting anguish.

Undoubtedly this case has!

Tom Campbell

Editor-in-Chief

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Business Fights to Hold the Line

Recession-type indicators continue to dominate business news. Unemployment, at 5.4 million, is the highest for any January since before WW II. Any gain worth noting in steel cannot be expected before April, if then. But there are some factors that give the idea that the worst may be over.

In one key metalworking market, appliance makers are cautiously seeing better things. (See p. 76) The money supply, instead of contracting, is expanding. This is generally a favorable sign. One analysis of purchasing plans indicates the business recovery should get under way shortly. Inventories just have to be low enough to stimulate buying, in spite of determination by most companies to keep them at rock bottom. Construction is picking up, and will gain momentum when weather improves.

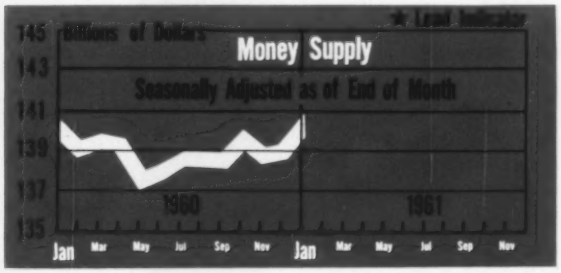
It takes time to reverse a trend, but some of the signs are starting to appear.

Buying Plans Look Better

At least one authority says purchasing plans have a better look. J. H. Hoagland of Michigan State University has analyzed the last survey of the National Association of Purchasing Agents. National and local returns indicate a marked slowing down of the rate of decline in January, he says. "A business recovery should begin within a few months and the current recession should prove relatively short and mild," he comments.

Money Supply Takes a Jump

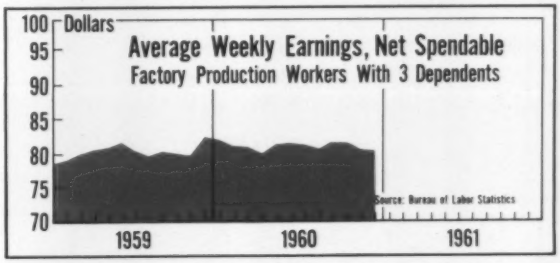
The money supply has been quietly edging up since May. It slipped last November, but gains since then



have continued the uptrend. This important lead indicator of the Federal Reserve Board shows little tendency on the part of business to retrench to the extent that could be expected. Instead, the gain, up to $140.6 billion at the end of January, could mean business and industry intend to stay fluid.

Higher Pay, But Shorter Hours

Factory workers' take-home pay and buying power dropped in December. The decline, to $80.35 spendable earnings for a worker with three dependents, in itself



isn't too great. But it comes at a time when seasonal factors usually mean an increase. Also, a 2¢ rise in hourly earnings was offset by a 0.4 hour decline in the workweek, the Dept. of Labor reports.

What About Anti-Recession Moves?

The question now isn't "what" anti-recession measures President Kennedy will take. It's what effect they will have on the economy, and when. Experience shows that government moves in this direction seldom have a quick effect. In spite of the President's urgency and demand for quick action, the same will probably be true now. The possible result: The effects of the current measures may come on top of a general recovery. The gloomy alternative: If the downtrend continues, it will take more than mild moves to make a significant impact on the economy.

Sec. of Labor Goldberg's weekend trip to some of the distressed areas served to call attention to the plight of these centers. It's difficult to see, however, where there can be much short-term aid. Unemployment now stands out as the most critical domestic problem.

Red "Dumping" Will Hurt

Russia is doing all it can to make U. S. financial troubles worse. This may mean an acceleration of "dumping" on world markets. The long term outlook points to more dumping of steel, pig iron, iron ore, manganese and other basic commodities. The formula will be to do anything that affects U. S. exports and otherwise depress world markets and prices.

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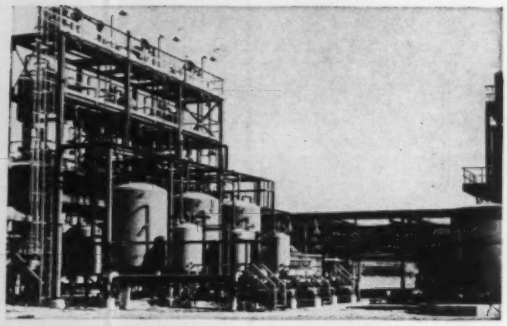

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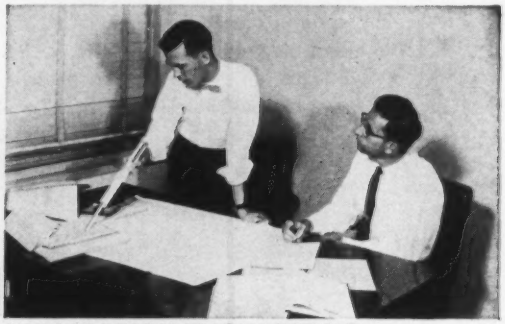

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UAW-USWA: Goldberg Is in the Middle

One of the key areas of discussion in labor circles is how Sec. of Labor Arthur J. Goldberg will handle the always-touchy relationships between union leaders.

These are the three critical questions, and some ideas of what to expect:

Q. How will Mr. Goldberg, who has always been identified with the Steelworkers, get along with the UAW's Walter P. Reuther?

A. Mr. Goldberg has never been in the Reuther camp. There is little chance that the two will be any closer now.

Q. Will there be any closing of the ranks between Steelworkers president David J. McDonald and UAW's Reuther? The rift, though not a public affair, has existed for some time.

A. A real healing of competitive scars between the two is not likely. They are competitors before they are allies. Each has to equal or match the other union's gains, or lose face with his union membership.

Q. How will Mr. Goldberg react to demands for special consideration from individual unions, particularly the USWA?

A. Mr. Goldberg is now a Kennedy man, and will fight for what the President wants. Also, he will take the broad view and will not chart a course favorable to one union, even the USWA.

Is Wage-Price Group A Controls Gimmick?

Labor Secretary Goldberg claims the new White House Advisory Committee on Labor-Management policies will not try to impose a compulsory system of wage-price controls on industry.

However, industry feeling in Washington is that President Kennedy's use of the committee could amount to controls.

Mr. Goldberg says the committee's aim is to enlist the cooperation of both labor and management in reaching "responsible" bargaining decisions.

USWA: Steelmakers Win C-O-L Issue

Efforts of steel producers to hold down unbargained-for boosts in the cost of fringe benefits are beginning to pay off.

Steelworkers won't get a 3¢-an-hour cost-of-living wage boost which was due last Dec. 1. The United Steelworkers of America has abandoned efforts to have the increase arbitrated for 500,000 workers in the mills.

Under terms of the present steel industry labor contract, a ceiling was placed on c-o-l increases. And it was also tied to the cost of insurance programs. The limit was set at 6¢ with no more than 3¢ to be due by Dec. 1, 1960.

When the increase came due, the Corporation said its insurance costs had risen by more than 3¢-an-hour, wiping out the c-o-l boost. The Steelworkers challenged this. The contract provides for arbitration.

By withdrawing from the scheduled arbitration meeting, the union concedes that insurance costs have risen by at least 3¢ an hour.

Minimum Wage Hearings Set

A House Labor Subcommittee will start holding hearings this week aimed at raising the minimum wage to $1.25 within three years and extending coverage under the Fair Labor Standards Act to another 4.3 million workers.

Few metalworking companies will be directly affected by the proposed increases. However, the higher minimum and extended coverage would put additional pressure on industry wage rates. It would narrow the gap between rates paid by industry and the minimum wage.

The bill was sent to Congress last week by President Kennedy. Rep. James Roosevelt immediately introduced it into the House.

The California Democrat will conduct four days of hearings before the subcommittee. Then, the full House Labor Committee, headed by Rep. Adam Clayton Powell (D., N. Y.), will start considering the bill on Feb. 23. Congressman Powell says he hopes to see the bill through both the House and Senate by Easter. It would take effect 120 days after passage.

The new wage bill would raise the minimum wage for workers already covered to $1.15 this year, then to $1.20 next year, and finally to $1.25 in 1963. Wages for newly-covered workers would be raised to $1 an hour the first year. In succeeding years it would climb to $1.05, $1.15 and finally to $1.25 in 1964.

Some groups will still be exempted from overtime provisions of FLSA. But after the first year, others would have their work week gradually reduced to 40 hours.

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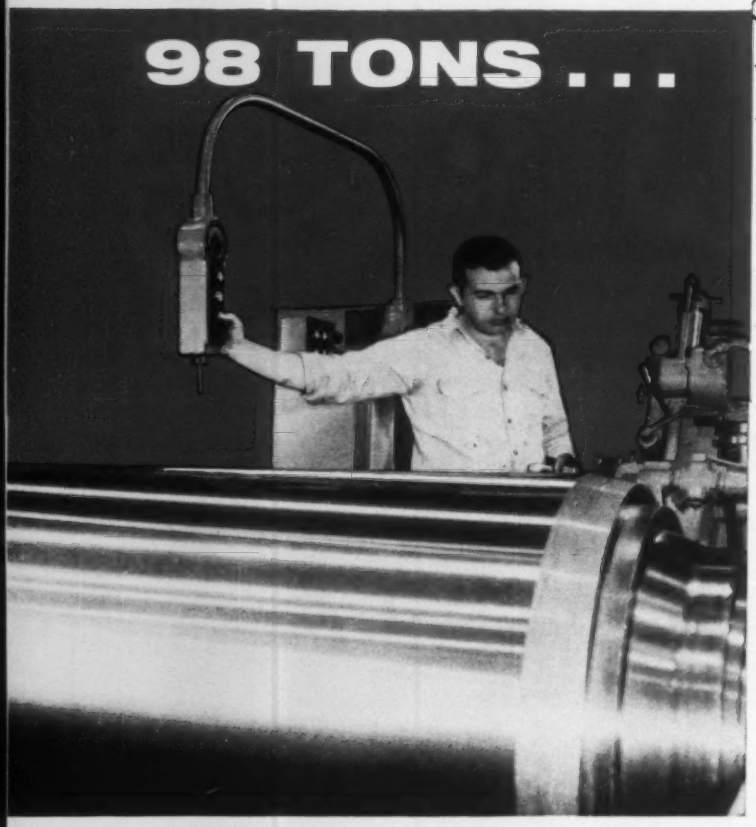
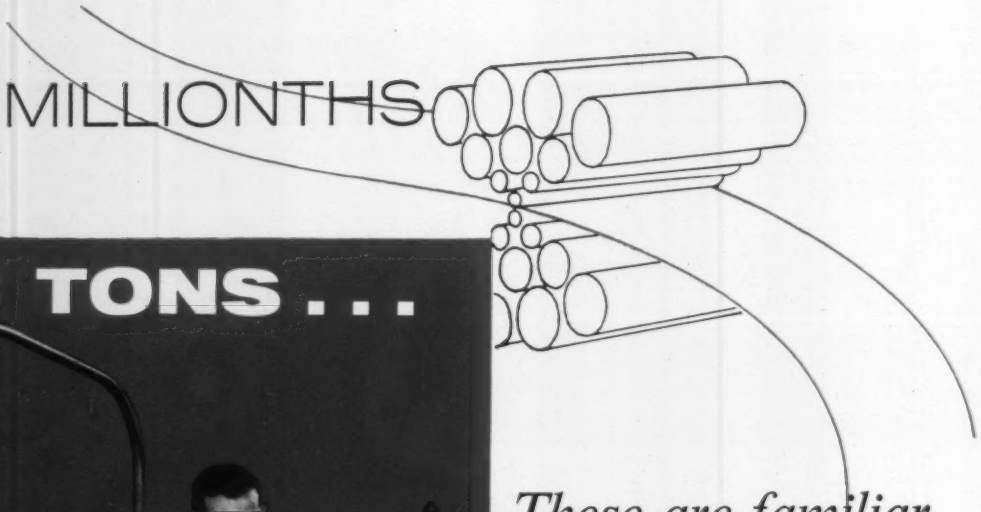
90 MILLIONTHS and 98 TONS . . .





These are familiar working specs for

CINCINNATI FILMATIC Roll Grinders

Heavyweight rolls weighing in at 98 tons are precision ground on CINCINNATI FILMATIC Traveling Wheelhead Roll Grinders. *(Photo courtesy Kaiser Aluminum & Chemical Corporation)*

Just imagine a sheet of steel so thin that a slight breeze could blow it away. This actually can happen to sheets rolled to a thickness of 90 millionths inch (.000090″) on a Sendzimir mill equipped with rolls finish ground on a CINCINNATI 10″ Roll Grinding Machine. At the other extreme, huge ingots, moved by a crane from soaking pits to heavy duty mills, are reduced between rolls ground on a CINCINNATI Traveling Wheelhead Roll Grinder. These machines handle rolls weighing up to 100 tons!

Between these two extremes, the Cincinnati Grinding Machine Division builds several dozen sizes of fine roll grinders. All are equipped with many cost-reducing feature-advantages such as exclusive FILMATIC grinding wheel spindle bearings, which run for years without adjustment or service. Aside from outstanding construction and design details, Cincinnati offers an unusual degree of integration, from the drawing board through foundry, research, machining, assembly, grinding wheels and grinding fluid. For complete information contact our Roll Grinding Specialists, or write for catalogs. **Grinding Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

Sizes and Types	*Catalog*
10″, traveling table	G-714
18″ and 24″, traveling table	G-709-1
24″ and 28″ heavy duty, traveling table	G-587-1
28″, 36″, 44″, 50″, 60″, traveling wheelhead	G-700

PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • CENTERLESS LAPPING

CINCINNATI®

GRINDING MACHINE DIVISION

★ Antitrust Action: A Warning

Justice Dept. officials say the recent antitrust action against the nation's biggest electrical equipment manufacturers is not the start of a "get-tough policy."

But they say the case is a warning to industries who might be considering similar practices. W. Wallace Kirkpatrick, acting head of the antitrust division, says he does not foresee the outcome of this case as the beginning of an antitrust trend.

However, he says he agrees with Baddia Rashid, chief of the antitrust division's trial section, that the verdict in the case is a warning to all big business.

In the case, 29 companies and 44 of their executives were fined a total of $1,924,500 for violations of anti-trust laws. Several executives were given 30-day jail terms, a rarity in antitrust cases. In all, the companies and individuals entered 71 guilty pleas and 90 of nolo contendere (no defense) to charges of fixing prices and rigging bids on heavy electrical equipment.

Mr. Rashid, the trial section chief, gave his warning in a courtroom statement. He told the court:

"The purpose of this litigation is to make clear that economic freedom in this country by way of competition is no less important and no less an ideal to be followed than political liberty."

■ Washington Examines U. S. Tool Status

The U.S. Commerce Dept. will soon release the first of a series of important reports on the status of the world's machine tool industry and where the U. S. stands in it.

The first report, on world-wide machine tool movements, is expected to be ready by mid-March or early April.

The report, being handled by the metalworking equipment division of the Business and Defense Services Administration (BDSA), will cover the activities of principal machine tool countries. Both exports and production will be surveyed.

Commerce Dept. officials hope the series of reports will lead to conclusions on the changing status of the U.S. as the world's leading machine tool producer and exporter. It is hoped that some indication how the U. S. can regain its place as the world's principal machine tool exporter will come out of the reports.

BDSA officials believe the reports will be a "tremendous management guide." They think that by analyzing the buying and selling of machine tools throughout the world, the reports will be valuable to U. S. machine tool producers.

The first study will cover world-wide machine tool movements through 1958. BDSA officials say the report will be brought up to date next year. Plans are to make it a perennial report.

The second report in the series is expected to cover factors of U. S. machine tool industry problems.

■ Welfare Costs Worry Congress

Congress is squirming under pressures of President Kennedy's new welfare benefits programs. Congressmen are worried because of the tax implications of the programs.

About $2.8 billion a year in higher payroll taxes—to be paid by nearly all U. S. businessmen and workers—would be needed to cover the bill for the new plans.

The proposed new benefits include: 1. A program of hospitalization and nursing care for 14 million persons 65 or older; 2. Bigger Social Security checks for widows; and 3. An extension of jobless pay for 3 million workers who have exhausted their unemployment compensation.

■ No Hiding Place

The Internal Revenue Service's fight against the use of foreign "tax havens" by U. S. companies now has the backing of President Kennedy.

The President recommends that Congress pass a law to prevent U. S. companies from using "tax havens" abroad to escape U. S. levies. He has also ordered the treasury Dept. to find out whether U. S. tax laws are driving "undue amounts" of American capital out of this country.

■ Three-Way Battle Over Red Shipment

A government controversy has erupted over shipment of 45 U. S.-made ball bearing machines to the Soviet Union. At odds are the Commerce Dept., the Defense Dept., and Sen. Thomas Dodd, (D., Conn.).

Commerce officials okayed shipment of the machines on the basis that machines of comparable quality could be bought in Europe.

The Defense Dept., however, asked that the machines not be shipped. Commerce suspended the license but later reinstated it.

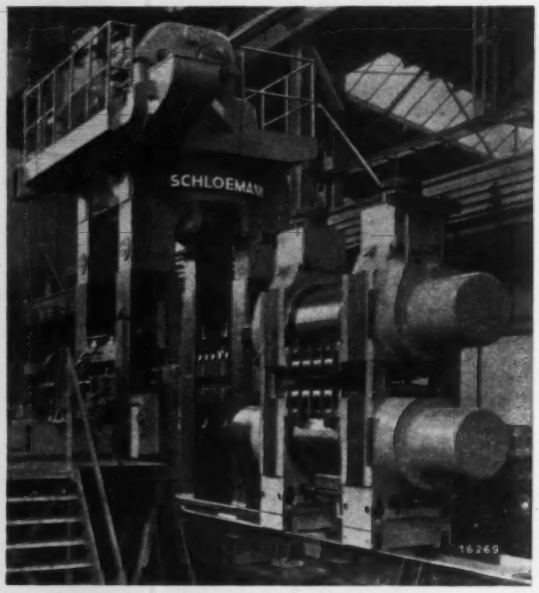
Sen. Dodd says he would have liked the suspension to have remained in effect, but was keeping an open mind on the matter.

UDC 621.944.9

SCHLOEMANN
ROLLING MILLS · HAMMERS · PRESSES

Multi-purpose rolling mill for "refractory" materials

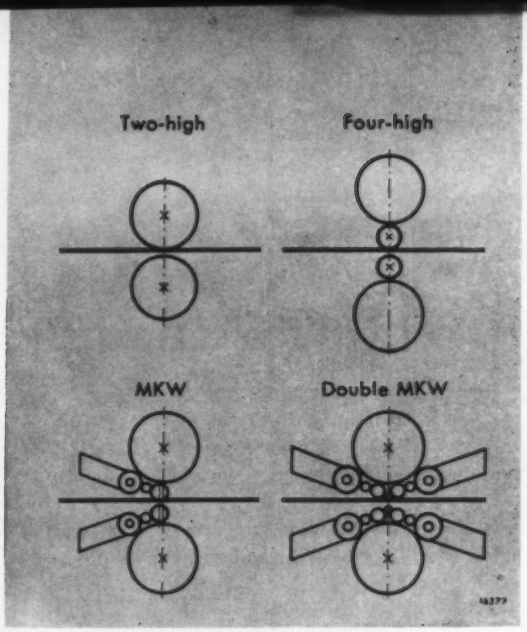
Special alloys for the nuclear power and other industries have presented extraordinary problems. The new MKW mill (US and foreign patents) developed by SCHLOEMANN is ideally suited for rolling these refractory materials and is readily adaptable



MKW 80 during workshop assembly. Above, the double MKW set-up is seen in run-out position; below, the view from the entry side shows the pay-off reel and coiler.

for conventional rolling work. Typical characteristics as included in the specifications of an MKW mill recently built for operation in the United States are as follows:

Hot and cold rolling – Initial thickness up to 2" Final thickness of strip – .006" standard; .001" min. Rolling force – in excess of 2200 tons at 24" strip width (twice the roll separating force required for rolling of conventional CrNi steels).



Four different roll set-ups for one mill:

Two-high set-up: 36" ∅ rolls

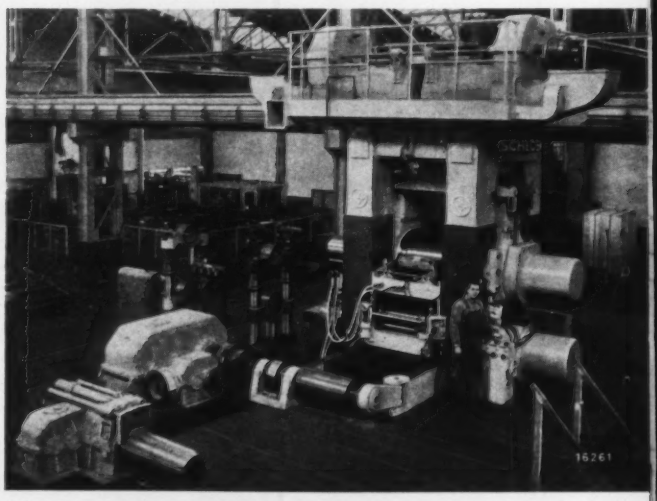
Four-high set-up: 16½" ∅ driven work rolls

MKW set-up: 36" ∅ driven back-up rolls, 5" to 5½" ∅ work rolls

Double MKW set-up: 36" ∅ driven back-up rolls, 2" to 2¼" ∅ work rolls

Wide working range

The mill is equipped with four different roll set-ups and is thus provided with an extremely wide working range. Since the new super high-grade but difficult-to-work materials are currently required in comparatively small quantities only, the use of one MKW mill with four different roll set-ups offers practical and economical advantages.



FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

Will U. S. Exports Keep Climbing?

The value of U. S. exports in December has been set at $1.8 billion by the Dept. of Commerce. This brings the estimated 1960 export total to $20.5 billion—somewhat higher than the previous record year of 1957.

Exports, of course, have been cited as one of the few strong points in the U. S. economy during 1960. However, there are many who doubt that exports will continue to rise.

The December "Survey of Current Business" points out that five major commodities — aluminum, copper, steel mill products, commercial aircraft, and raw cotton—were responsible for the major gains in export activity last year.

Also, both Western Europe and Japan, currently realizing unprece-

dented boom conditions, were markets for 75 pct of the overall U. S. export increase. Unless other markets begin booming, exports may suffer.

Developments during the late summer and early fall point up that European production is approaching its capacity limitations. The Commerce Dept. says these economies are now "retarded by bottlenecks."

In Japan, the rate of production has not yet suffered much and the economy is still expanding rapidly. However, some experts feel the dropoff in expansion will soon come there, too.

Bearing this in mind, many industry leaders are seriously watching African nations as possible major export markets. India, also, is poised for more rapid industrial expansion.

In fact, India was this country's biggest overseas customer of steel mill products in November with nearly 23,000 tons. Nearly half of this tonnage was in hot-rolled sheets.

British Auto Recession Eases

There are reports that the auto recession that has been plaguing Britain in recent months may be easing. British Motor Corp., Ltd., and Ford Motor Co., Ltd. both announced this week that production is being stepped-up.

Since mid-1960, British auto sales have fallen off sharply. The full extent of the recession is revealed in December's production figures. Only 76,783 cars came off the assembly lines compared to 134,881 in December, 1959.

Export sales dropped from 49,555 in December, 1959 to 29,224 during the same month last year.

Industry Leaders Seek Procedure Change

Industry leaders are seeking a major revamping of U. S. procedures for negotiating trade agreements.

The industry officials want more direct Congressional control over negotiations with foreign countries and less secrecy surrounding recommendations the Tariff Commission makes to the President.

They charge that the people administering the Trade Agreements Act "appear to have lost sight of the fact that the power to determine rates of duty rests exclusively with Congress."

Backers of the present trade policy point out that Congress, through various laws, has delegated the power to set specific rates to the White House.

Budd Joins Mexican Venture

The Budd Co. has joined with a new company in Mexico — Auto-Manufacturas, S.A. — to manufacture automobile brake drums, hubs and related parts.

The new company will manufacture these components in facilities to be built near Mexico City. The parts will be supplied to the Mexican automobile and truck industry.

Congo Zinc Up

There were many fears early in 1960 that political developments in the Congo would mean restrictions in Congolese zinc concentrates output. However, the actual figures for 1960 zinc production in the Congo, issued by Union Miniere, show a big increase.

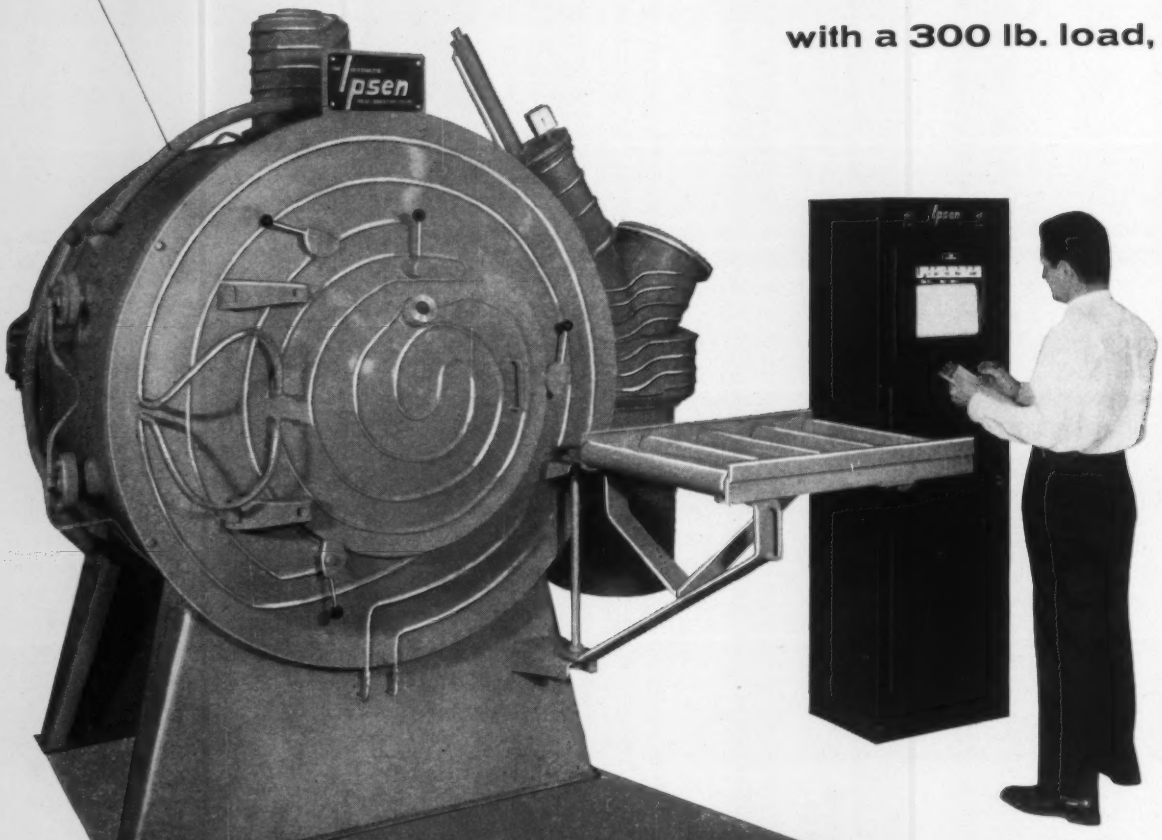
Output of concentrate in 1960 was 192,000 metric tons compared to 118,000 tons in 1959. Zinc metal production in the Congo, though somewhat lower, was also sustained last year.

Canadian Auto Output Hit

The impact of the suffering U. S. auto industry is now being felt in Canada. It comes with word that General Motors Corp. will have a one-day shutdown at the passenger car division of its Oshawa plant. Chrysler Corp. is already operating on a three to four-day work week at two of its three Windsor plants.

Fast Cool....2100° to 500° in 14 minutes!

with a 300 lb. load,



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Automatic Vacuum
Heat-Treating Unit.

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½ THE OPERATING COST OF A HYDROGEN FURNACE!

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AUTOMATIC Ipsen HEAT TREATING UNITS

IPSEN INDUSTRIES, INC. • Dept. 725 • P.O. BOX 500 • ROCKFORD, ILLINOIS

Controls Grain Size

A new Swiss device checks the gas content of a steel heat and automatically records it in 3.5 to 6 minutes—while the heat is still in the furnace. This permits adjusting deoxidation elements to match oxygen content and allows the determination of nitride content. By regulating grain size, the new device acts as a production control. It's also a fast research tool.

Electronic Draftsman

In less than a half second, electron beams turn out complex drawings from computer-fed data. This action hinges on a high-speed microfilm recorder. A mathematical code, supplied by the computer, serves for both electrical and engineering diagrams. Drawing with electron beams, the recorder produces all lines, curves, symbols and dimensions for multiview prints.

Checks Weld Distortion

A major fabricator of steam turbines reports success in controlling weld distortion. A specially-built hot plate has been in constant use for over a year to aid the welding of critical diaphragms. So far, only one diaphragm has cracked. The electrically-heated unit maintains the exact preheat needed during the weld cycle.

Bolt Measures Stresses

Strain gages in the neutral axis of a new bolt's shank monitor the stresses on bolted assemblies. These gages measure tightening loads and changes in a bolt's load due to vibration, shock or wear. Recorder wires snap over the bolt's head with a two-pin seal. Accuracy of the 5/16- to 1½-in. diam bolts is ±1 pct.

Oil Costs Tumble

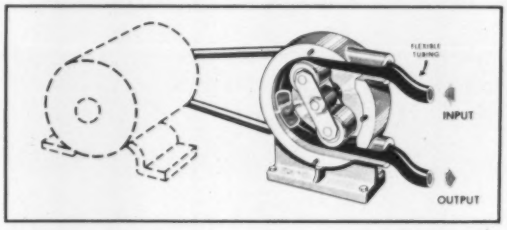
First bulk-grease delivery in the Pittsburgh area, and one of the first in the nation, was made recently to the Crucible Steel Co. of America. Using a specially-designed bulk truck, Humble Oil & Refining Co. delivered 20,000 lb directly to a storage tank at Crucible's Midland Works. According to Humble, bulk delivery saves consumers about 40 pct of oil costs. Service is being extended to other areas.

Extend Silicon-Oil Life

Oxidation inhibitors extend silicon-oil life up to 500 pct. This is the word from the U. S. Naval Research Laboratory. The Navy's latest silicon-oil stabilization study was made at temperatures between 250°-371°C. Results prove that silicon breakdown is primarily an oxidation process. High-surface solids such as Shawanigan black and ferric oxide preclude oxidation.

Roller-Squeeze Pump

Without breaking tube connections, a new pump can be put into service. With a squeezing action, it delivers up to 185 gpm. No moving parts contact the fluid being pumped. Thus, the



newcomer handles a wide variety of corrosive and abrasive liquids. Tubing life is extended indefinitely by pulling the flexible tube a few inches through the pump's dual rollers every 8 hours.

Solves Dust Problems

Flue dust and sinter fines from blast furnaces present tough disposal-handling problems. A new approach centers on a unit that suppresses the dust by adding a controlled amount of moisture to the waste as it's shipped from collection areas. This eliminates the need for reducing the dust matter into slurry form.

SINGER* NUMERICAL CONTROL

The Singer Numerical Control System represents the most direct approach to point-to-point positioning yet conceived. It offers simplicity, reliability and economy, reducing costs of maintenance, labor and downtime.

A major feature of Singer automation is modular design. This makes it possible to assemble basic units in a variety of control systems.

AUTOMATIC POSITIONING SYSTEM

For example, because of the simplicity of Singer modular design, an Automatic Positioning System can be furnished immediately as standard for use on a drilling machine to drive and position the work table and saddle motion.

All that is required is a motor drive assembly (A) and a position indicator control (B) on each axis. This system will then operate with standard end measures.

At any future time, tape control can easily be added to provide a complete Singer Numerical Control System, as shown below with a Fosdick 5BM Sensitive Drill Press.

(A)
(B)
Diehl
POINT-TO-POINT POSITIONING
AN INVITATION
You are cordially invited to visit the Singer Numerical Control demonstration room at the Diehl Manufacturing Company
Diehl†
DIEHL MANUFACTURING COMPANY
SUBSIDIARY OF THE SINGER MANUFACTURING COMPANY
Finderne Plant, Somerville, New Jersey
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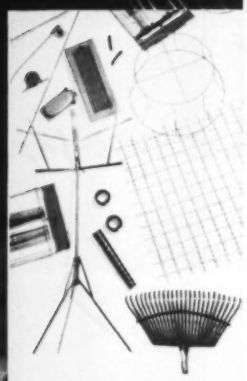

A few of the thousands of high-quality items made from superior Roebling cold rolled steel.

Advantages for You

IT ALL COMES DOWN to one fact...that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You pay for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. For details, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

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Roebling... Your Product is Better for it

PHOTO BY NEWMARK

By the drumful, shovelful, scoopful, handful, or spoonful . . . Sherritt nickel is about the most convenient alloying metal you can buy. No wrestling with unwieldy plates. No cutting or hacking. High-purity Sherritt nickel comes to you in handy briquettes and in three grades of powder for faster, easier alloying. These powders and briquettes go into solution more rapidly with less chilling. You can make alloying additions at the end of the heat. Special nickel grades and coated powders are also available.

FOOTE MINERAL COMPANY *is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For complete illustrated brochure with prices and delivery information, contact the Foote Mineral Company,438-S Eighteen West Chelten Building, Philadelphia 44, Pa.*

SHERRITT GORDON MINES LIMITED

The Facts

Sir—In the interest of presenting factual information to your readers, I am sure you will want to correct an impression that was made by one portion of your article captioned "Do You Make These Mistakes in Europe?" which appeared in a recent issue. The statement was made therein that high-strength low-alloy steel is not generally available.

Actually this grade of steel is available in quality, quantity and range of products. United States Steel Corp. has license agreements with seven European steel producers on the Continent and in the United Kingdom to make and sell COR-TEN high-strength low-alloy steel to the same high-quality standards to which we produce this grade in our own mills. These seven producers are turning out substantial quantities. In addition, U. S. Steel is selling direct from its American mills this and other high-strength low-alloy steels to European equipment manufacturers with no problem on availability. Also, there are numerous European trade name high-strength low-alloy steels which have been noted on competitive bids made public for such items as railroad cars and bridge jobs.

All of this actively indicates that steel consumers in Europe are aware of the potential economies through the use of high-strength steels, and that European steel producers are responding to the demand.—Lewis T. Gibbs, United States Steel Corp., Pittsburgh, Pa.

Impressed

Sir—Our division is impressed with the editorial from the Jan. 5 issue of The IRON AGE entitled "Get Your Shoes Fixed: A Long, Rocky Road Ahead." We are considering forwarding a copy to the homes of all the employees of our division.

We have a reprint of this editorial; and consider it possible that reprints are available in quantity. We shall require 550 copies to make a mailing distribution. We respectfully request your permission to reprint, with credit to The IRON AGE; or that you advise if reprints are available.—Lee D. Smith, The Bendix Corp., Cincinnati, O.

■ **We don't have that number of reprints on hand, but we're more than happy to give you permission to reprint for yourself.—Ed.**

Study Seeker

Sir—In your editorial "Communications Crisis: It's Worse Than You Think" which appeared in a recent issue of The IRON AGE, you mention a current study. Could you tell me who made this study and where I may see its complete results?—Jacob Haun, Jr., West Engineering Co., Richmond, Va.

■ **This information was contained in a talk by Prof. R. G. Nichols, chairman, Dept. of Rhetoric, Univ. of Minnesota. He recently gave the talk at the Univ. of Michigan.—Ed.**

"And this is you right here. Beginning to get the idea, Peebles?"

STANDARDIZE 100% ON SOUTHERN FASTENERS

Southern SPECIALIZES in

Standard Fasteners for METAL

When you specify Southern fasteners, you are adding quality to your products and speed to your assembly operations. Southern Screw is a specialist in plated or plain USA-made standard fasteners for the metal industry. This means dependable quality and reliable service with every order. Buying from Southern also means that your "specials" may be a standard stock item in Southern's 1,500,000,000-piece supply at the Statesville, North Carolina plant.

Write for and examine Southern Screw's current stock list. Then see what 15-year specialization in making quality fasteners can mean to you. Address: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

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WAREHOUSES:
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Machine Screws & Nuts • Tapping Screws
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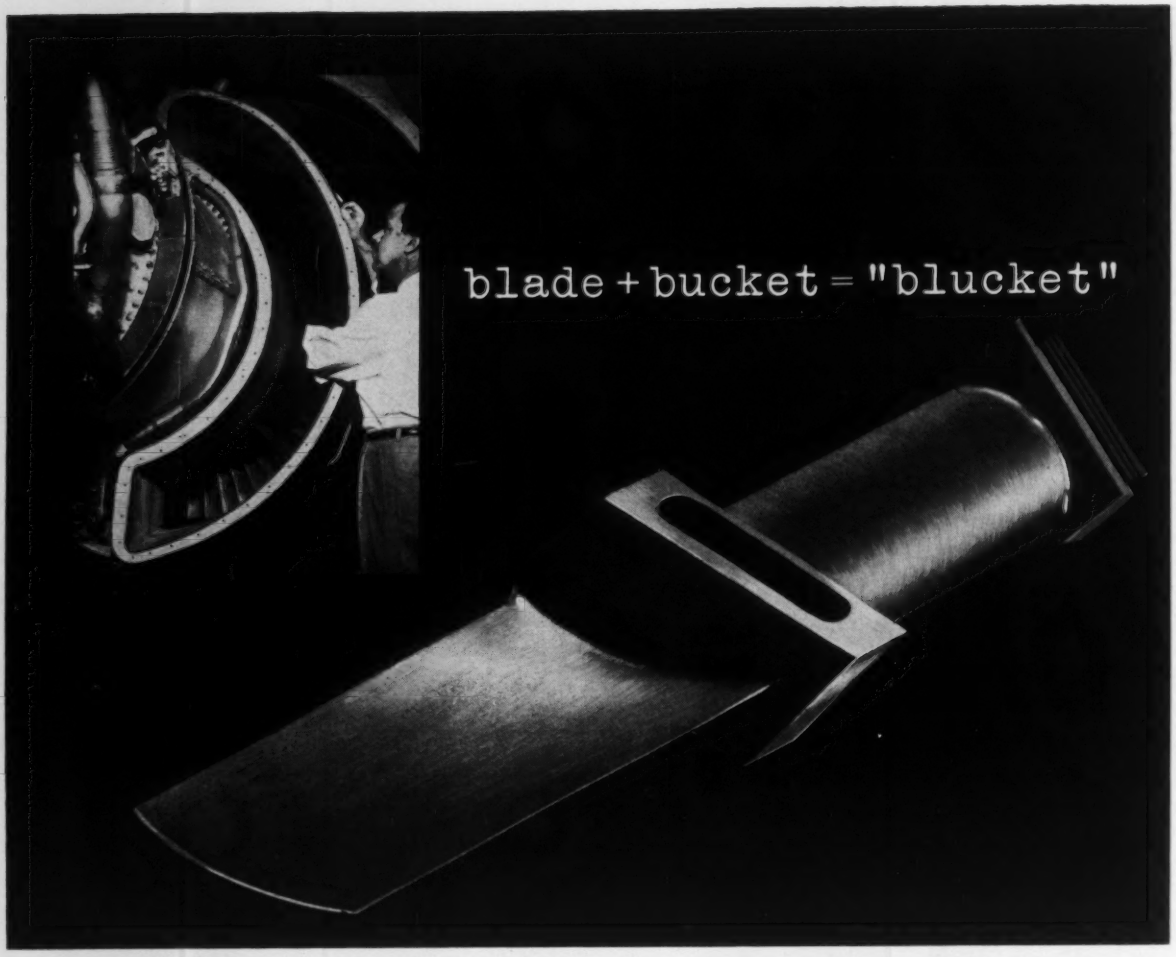


new design in *Carpenter* high temperature alloy V-57

Everything about this combination fan blade-turbine bucket is new except its predictable performance . . . a built-in characteristic of all Carpenter high temperature alloys.

V-57 is the super alloy now used to forge this unique new jet engine component. V-57 replaced A-286 (originally used) because of its superior mechanical properties at operating temperatures. Like all Carpenter vacuum melted metals, V-57 is produced with exclusive Carpenter quality controls that permit tighter forging tolerances, better machinability and improved cold forming properties.

Carpenter's VACUMELTROL® (induction vacuum) and CONSUMET® (consumable electrode) melting processes assure you more accurate forgings with better finishes, fewer rejects, faster production . . . and, most important . . . true predictable performance in your high temperature alloy components. Ask your Carpenter Representative for details.

Carpenter steel

you can do it ***consistently*** better with Carpenter Specialty Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

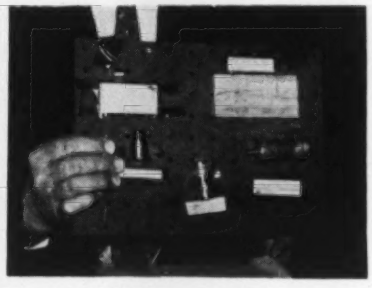
FATIGUE CRACKS

Righteous Indignation

For as long as most of us can remember, military waste and duplication in procurement have been a subject of controversy. So much so that we sometimes despair that there will be any big change.

But the evidence continues to build up and in this week's Special Report p. 73, Ralph Crosby, IRON AGE Washington editor, reports on new developments and efforts to cut into the massive area of spending.

On this week's cover you will see one of the leaders in the attempt, Sen. Paul H. Douglas. If



WASTE: Some examples.

you note an indignant expression on his face, there's a reason.

On the board he is holding (see cut, here) are examples of waste uncovered by his office. The Dept. of Defense, he says, bought these items for much more than their value.

In the lower right corner of the board (in the picture), is a locating plug for which the Air Force paid $11.00 and which his office appraised at 50¢. Above that is a gage block for which the Air Force paid $15.00 and which his office bought for 50¢.

Either Sen. Douglas is a smart shopper, or something is wrong somewhere.

The First 75

This month is an important one for the aluminum industry. It's the 75th anniversary of the discovery of the electrolytic reduction process.

Aluminum had previously been isolated, the Aluminum Association reminds us. But economical, large-scale production had industry stymied until Charles Martin Hall came along.

Youth and Coincidence — Mr. Hall, son of a small-town minister, developed the electrolytic process in 1886 in a woodshed laboratory near his home in Oberlin, Ohio. He was only 22 at the time.

Another inventor, Paul Heroult, made the identical discovery in France in the same year and month —February, 1886.

Coincidences are plentiful in the stories of these two men. Both were born in the same year—1864. Both were virtually penniless before they made the discovery. Each worked in a makeshift laboratory. And both lived to enjoy the rewards of their genius. One last coincidence: Both died in 1914 at the age of 51.

Old Grads

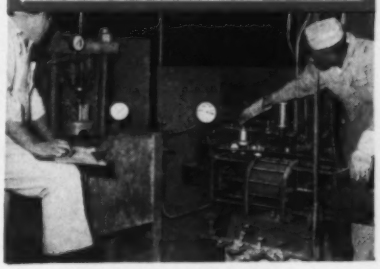
We're always interested in what has happened to former IRON AGE staffers. It's surprising how often we run into a man of prominence who recalls, fondly, we hope, that he once was on our staff.

This week we picked up an interesting release from the International Cooperation Administration. It tells the story of how Prof. Linn Helander, former head of the mechanical engineering dept. at Kansas State, is making headway establishing an advanced engineering program in Sao Jose Dos Compos, Brazil, at the Aeronautical Institute of Technology.

We wonder if any of our veteran readers recall that Prof. Helander was on the editorial staff of The IRON AGE for a period from 1917-1918. After all these years, the educator remembers it well enough to include it prominently in his biographical material.

His present assignment is to introduce and teach a course in heat transfer, train men to teach the course when he leaves, and assist on curriculum.

WHERE CAN THESE ALDRICH PUMPS CUT YOUR COSTS?



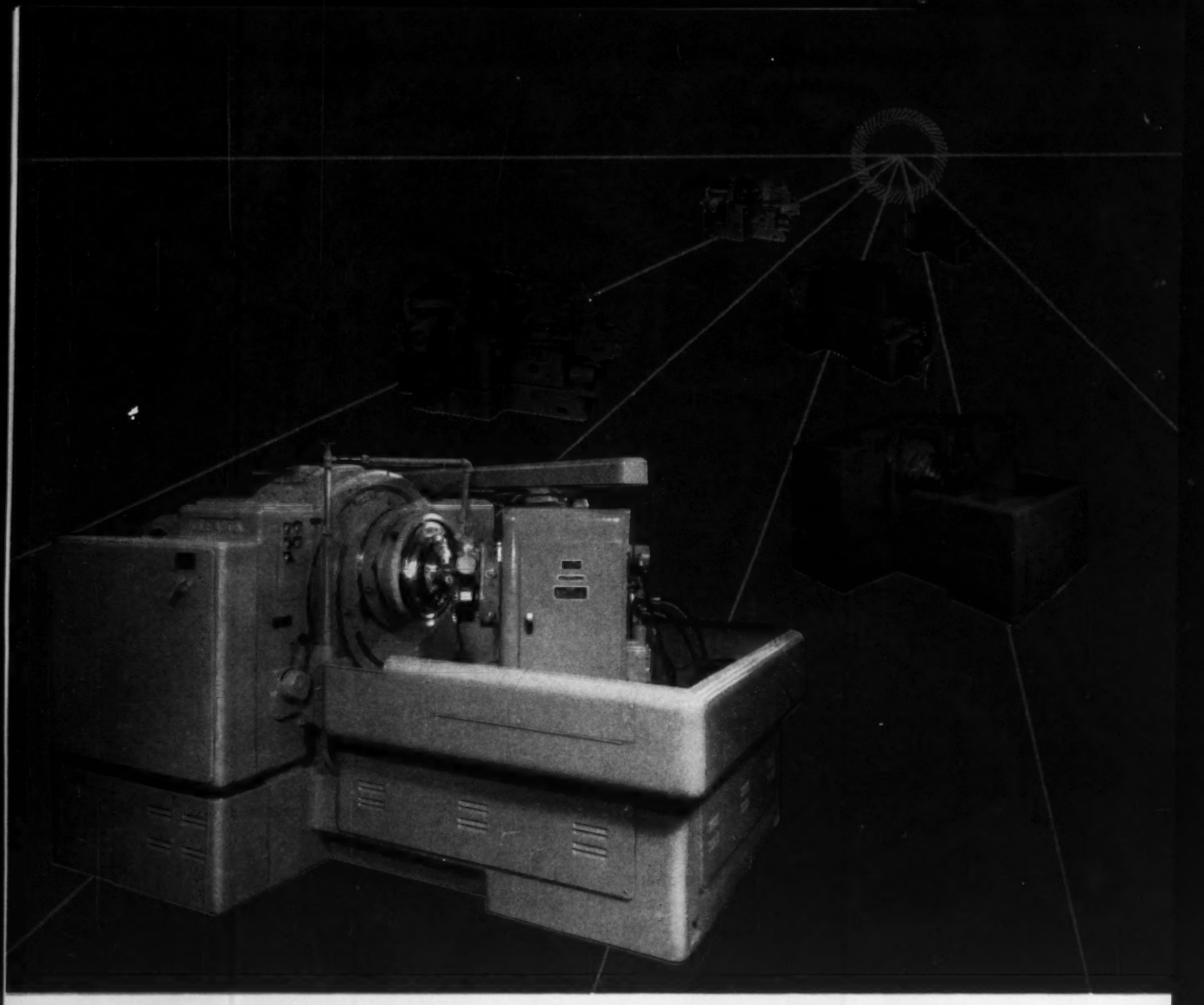
The Aldrich Horizontal Air-Driven Pump is never idle; there's too much it can do. Never down; it's built too well. Delivers pressures to 50,000 psi from 90 psi plant air. Use it to power your presses, or for all types of high-pressure testing in your plant or laboratory. Pump above tests castings and forgings for missile, nuclear and other industries on a production line basis.

Need sustained, unvarying hydraulic pressures? Aldrich-Groff "Powr-Savr" Pumps provide stepless, straight-line capacity control from zero to rated output, maintaining pressures automatically, accurately and indefinitely. RCA Record Division, Rockaway, N.J., says pumps above "do a wonderful job" controlling critical record-molding pressures 24 hours a day, 5½ days a week!

When the pressures are high, or the liquids tough to handle, an Aldrich is *the* pump. 25 to 2500 hp; pressures to 50,000 psi. Write for complete data, or help on your specific pumping need. Aldrich Pump Company, 10 Gordon Street, Allentown, Penna.

THE TOUGH PUMPING PROBLEMS GO TO

ALDRICH



Now . . . one machine does the work of five!

For small production runs—here's *one* gear-cutting machine with the flexibility of *five!*

The Gleason No. 118 Hypoid Generator roughs and finishes both gears and pinions—using four cutting methods that formerly required a battery of five machines. When production requirements increase, you simply add other machines, the 118 becoming a specialized member of your production team.

1. Single-Cycle® Method. Using this method, you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single-Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine, using the conventional single-roll generating method.

2. Cyclex® Method. For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

3. Generated Gears and Pinions. You can produce both gears and pinions on this machine with the generating method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter. Once the gear is chucked in the work head, the machine operation is entirely automatic.

4. Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

*Trademark

The No. 118 Hypoid Generator handles gears up to 18″ diameter at a 10:1 ratio, to a *maximum* coarseness of 2 DP. For production of smaller gears, the No. 108 Generator cuts gears up to 8½″ diameter at a 10:1 ratio and to 4 DP. A third model, the No. 28 Hypoid Generator, cuts gears up to 33″ diameter at a 10:1 ratio, 1½ DP.

For complete information, send for bulletins on all three machines.

GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

COMING EXHIBITS

Western Metal Show — March 20-24, Pan Pacific Auditorium, Los Angeles. (American Society for Metals, Metals Park, Novelty, O.)

National Packaging Show — April 10-13, Lakefront Exposition Hall, Chicago. (American Management Assn., 1515 Broadway, Times Square, New York 36.)

Welding Show — April 17-21, New York Coliseum, New York. (The American Welding Society, 33 West 39th St., New York 18.)

Powder Metallurgy Show — April 24-26, Hotel Sheraton - Cleveland, Cleveland. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Castings Show—May 8-12, Brooks Hall, San Francisco, Calif. (American Foundrymen's Society Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 22-25, Cobo Hall, Detroit. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

FEBRUARY

The Metallurgical Society of AIME —Annual meeting, Feb. 26-Mar. 2, Ambassador and Chase-Park-Plaza Hotels, St. Louis. Society headquarters, 29 West 39th St., New York.

Assn. of Iron & Steel Engineers—Western meeting, Feb. 27-Mar. 1, Hotel Statler, Los Angeles. Association headquarters, 1010 Empire Bldg., Pittsburgh.

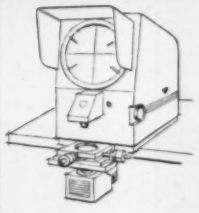
MARCH

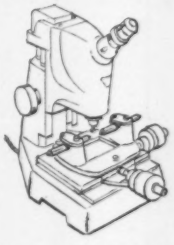
Malleable Founders Society—Technical and Operating conference, Mar. 1-2, Pick-Carter Hotel, Cleveland. Society headquarters, 781 Union Commerce Bldg., Cleveland.

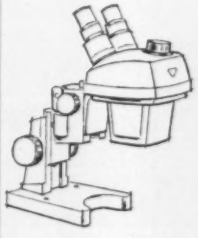
Can Manufacturers Institute, Inc.—Annual & Board meeting, Mar. 6, Waldorf-Astoria, New York. Institute headquarters, 821 15th St., N. W., Washington, D. C.

(Continued on P. 26)

Let's talk about YOUR precision measurement problem!







Do you need fast, accurate measurements to a "tenth" or better? Some contour, an angle? Or odd-shaped small parts that have to meet tight tolerances in *all* dimensions?

Maybe all you need is a reticle in an eyepiece of our popular new StereoZoom® Microscope. Or the critical accuracy of our Toolmakers' Measuring Microscope. Or perhaps our Bench Comparator, for the dual capability of measurement *and* silhouette comparison. Or—but why just guess about it?

We have a complete line of optical measuring instruments ready to help you. More than that, we'll be glad to suggest the equipment that will do the job best, at lowest cost. No obligation, of course. Just drop the coupon in the mail today and let our experts brainstorm your problem.

BAUSCH & LOMB
SINCE 1853

Made in America, to the world's highest standard.

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85214 Bausch St., Rochester 2, N. Y.
My measuring problem is .....
.....
.....
Please advise, with no obligation on my part.
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COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

From raw steel to finished product . . .

McKay Packaged Production Lines help Tex-Tube, Inc. lead the way in the Southwest

The McKay Machine concept of developing completely integrated, packaged production lines is paying dividends for Tex-Tube, Inc., a fast-expanding manufacturer of structural and petroleum tubing of Houston.

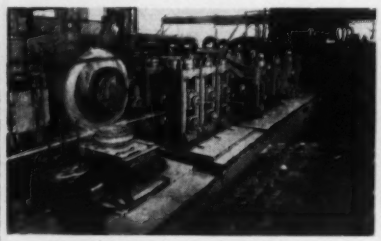
For Tex-Tube, McKay engineered a production unit that will form a complete line of tubing in a wide range of sizes from large multiple width coils.

The McKay production unit consists of a slitting line and two tube mills integrated with a shear welder. Tex-Tube is able to limit inventory only to gauge and type of steel . . . to slit to width desired, form, weld and cut-to-length tubing at a combined rate of 300 fpm in a smooth, continuous operation. They can, on this compact line, form tubing in size ranges from 1″ to 6⅝″ and any wall thickness up to 3/16″.

The result: Users of line pipe, oilwell casing and tubing, shothole casing, mechanical and structural tubing are assured quick delivery of highest quality tubing at fair prices.

Whatever you make—if it requires metal handling, feeding, slitting, shearing, stamping, welding or forming—you should know about McKay Packaged Production Lines . . . production equipment engineered to work in unison, with one-source responsibility from start to finish. Write for literature to *The McKay Machine Company, Youngstown 1, Ohio.*

SHEARWELDER—designed and built by Metal Processing Machine Co., subsidiary of McKay—trims tail of one coil and leading edge of second coil, welds them together in perfectly smooth weld while tube mill is running.



TUBE PRODUCTION—Series 700 McKay Mill, one of the two at Tex-Tube—gives Tex-Tube fastest production of top quality welded tubing in the widest variety of sizes.

CUTOFF—an integral part of the tube mill, it is a combination saw and rotary head type—cuts to exacting length, feeds onto automatic sizing and inspection table.

LOOK TO

McKAY McK **MACHINE**

FOR PROGRESS IN METAL PROCESSING

Charles A. Carter (left), chairman and president, and I. Walker Shaw, vice president, of Tex-Tube, listen as C. W. Thomas, McKay sales manager, points out that even though mill speeds have been increased substantially, the McKay process develops highest possible weld quality.

PHOTO BY ARNOLD NEWMAN

STEELARC

CUTTING ELECTRODE

CHAMFER ROD

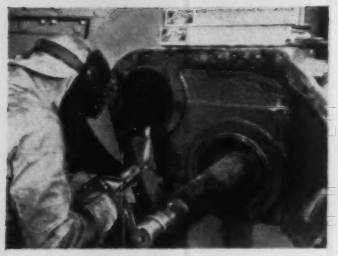
the versatile electrodes for field work to JOIN · CUT · SHAPE

Used extensively in construction • road building • farming mining • job shops • maintenance work

STEELARC® is All-State's specially coated electrode for all mild steel work —flat, vertical, overhead positions. Pass on pass without slag removal. AC or DC. One rod inventory.

All-State CUTTING ELECTRODE for fast, economical arc cutting of steel, cast iron, stainless, high chrome armor plate. AC or DC.

All-State CHAMFER ROD for chamfering, gouging, bevelling, routing and channeling without oxygen or air. Made with special compounded flux coating to protect rod and speed work. AC or DC.



High speed Cutting Electrode slices through cast iron machine housing. This one low-cost electrode cuts any ferrous alloy, lowers inventories.

Economical • Practical • Versatile • Distributors everywhere.

Send for a free copy of our 56-page Manual and Catalog.

All-State

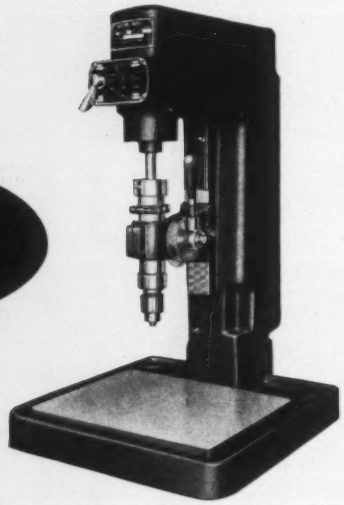
ALL-STATE WELDING ALLOYS CO., INC.

White Plains, N.Y. Dial 914 WH 8-4646

QUALITY WITH SERVICE

production drill for precision holes

Avey



Let us show you how to knock hours off your production and precision drilling with this MA-8. Capacity to ⅜". Eight spindle speeds with 10:1 range (variable speeds optional). Hand feed or air hydraulic. 12" swing. Column or bench type. One to six of our famous precision spindles, which give you quiet, vibrationless speeds up to 12,000 rpm. Send for Bulletin 857 or phone us. Avey, Box 1264, Cincinnati 1, Ohio.

MEETINGS

(Continued from P. 23)

Steel Founders' Society of America —Annual meeting, Mar. 11-14, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Mar. 13-17, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, Box 175, Pompton Plains, N. J.

Society for Non-Destructive Testing — Western regional convention, Mar. 20-24, Ambassador Hotel, Los Angeles. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar. 22-24, The Royal Orleans, New Orleans. Association headquarters, 5225 Manning Place, N. W., Washington, D. C.

Pressed Metal Institute — Spring technical meeting, Mar. 22-24, New York. Institute headquarters, 3673 Lee Rd., Cleveland.

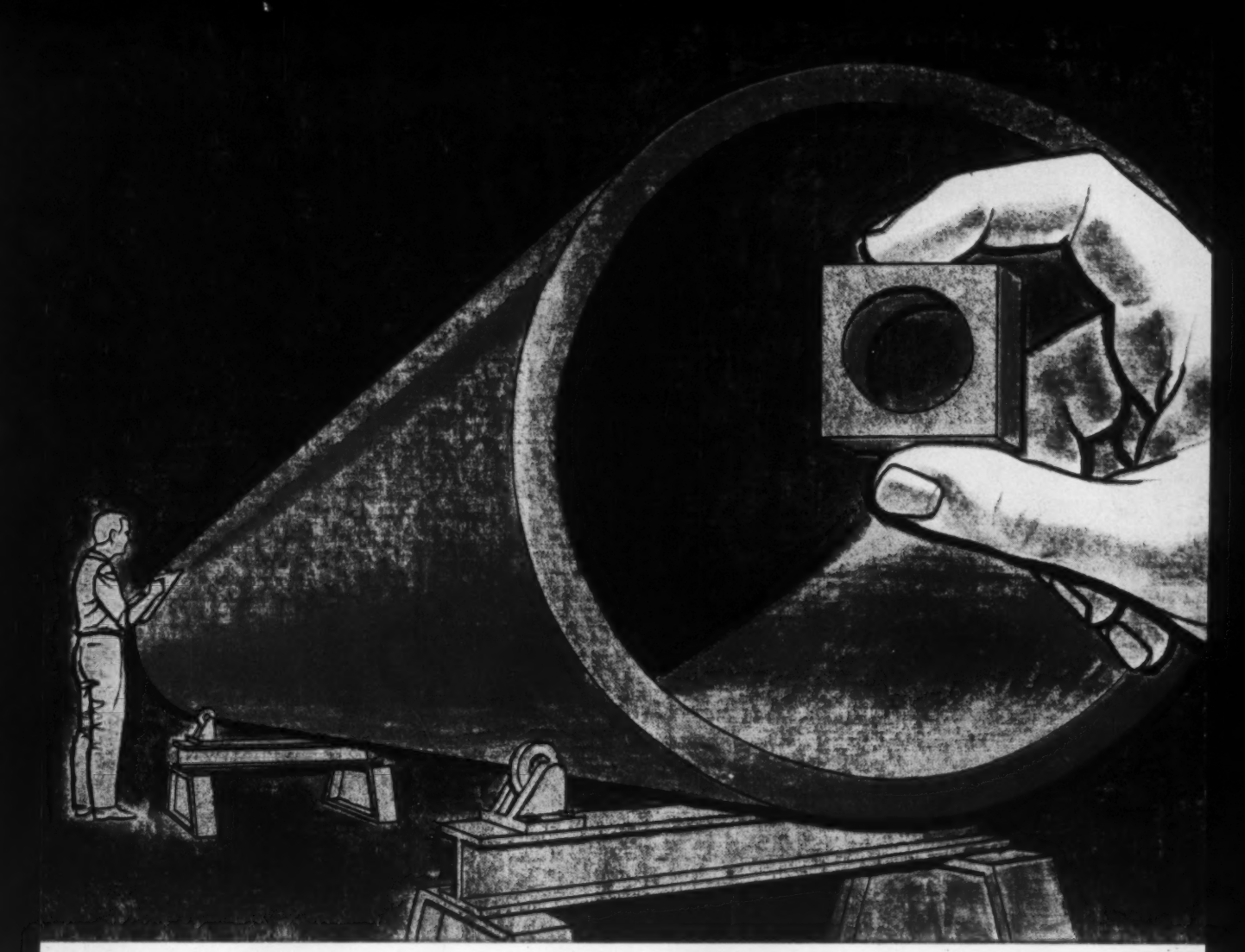
Air Moving and Conditioning Assn., Inc.—Mid-year meeting, Mar. 22-24, Whittier Hotel, Detroit. Association headquarters, 2159 Guardian Bldg., Detroit.

American Machine Tool Distributors Assn. — Spring meeting, Mar. 23-25, Hotel Mark Hopkins, San Francisco. Association headquarters, 1500 Massachusetts Ave., N. W., Washington, D. C.

APRIL

The Metallurgical Society of AIME —National Openhearth Steel Conference, Apr. 10-12, Sheraton Hotel, Philadelphia. Society headquarters, 29 West 39th St., New York.

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 11-13, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.



From the largest to the smallest you'll save money with Shenango Centrifugal castings

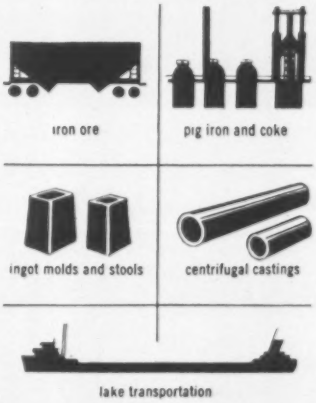
From tiny liners and bushings to the largest sleeves, rings and rolls, you'll find that ferrous or non-ferrous symmetrical parts will be cleaner, denser and more uniform if they are centrifugally cast in Shenango's modern foundry. This means you'll save money. There will be less metal wasted, less machining time, fewer rejects and longer product life than would be true with ordinary casting methods. And because Shenango operates one of the biggest and most efficient centrifugal foundries and machine shops in the country, your largest orders will be filled quickly and exactly to specification. Write for literature.

CENTRIFUGAL CASTING DIVISION

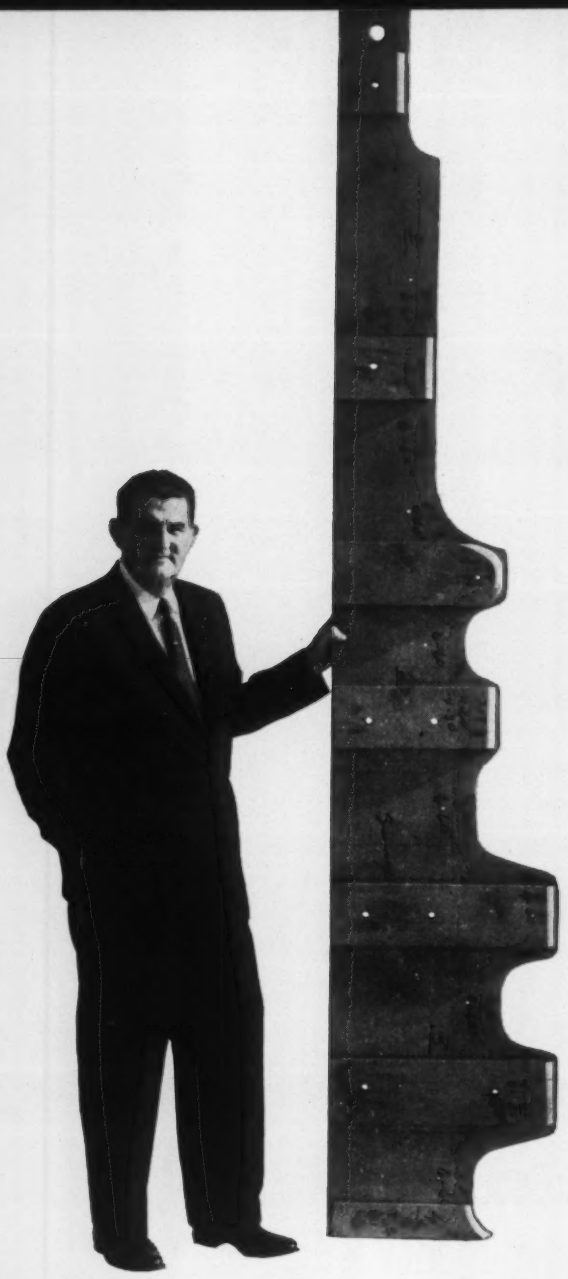
the Shenango FURNACE COMPANY

DOVER, OHIO

THIS IS SHENANGO!



Copper, Tin, Lead, Zinc Bronzes • Aluminum and Manganese Bronzes • Monel Metal • Ni-Resist • Meehanite Metal • Ductile Iron



Growth is our pattern,
steel rolls our business The mold sweep held by Deac Scholl, Manager of Roll Sales, will help form the contours of another steel roll—one of the hundreds furnished by National in its rapid growth as a steel roll supplier. Their high quality, proved in service day after day, is responsible for the increasing number of mills turning to National for their steel roll requirements. Our sixty years experience in roll making is your assurance of our dependability and know-how. Talk with a National man about your next roll requirement—whether steel, iron or nodular iron. You'll find out why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL CASTINGS CORPORATION, Avonmore, Pennsylvania
General Steel Castings Corporation, General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

versatility:

precision grind TWO parallel surfaces of widely varying parts in ONE operation

Gardner 2H30
precision double spindle grinder

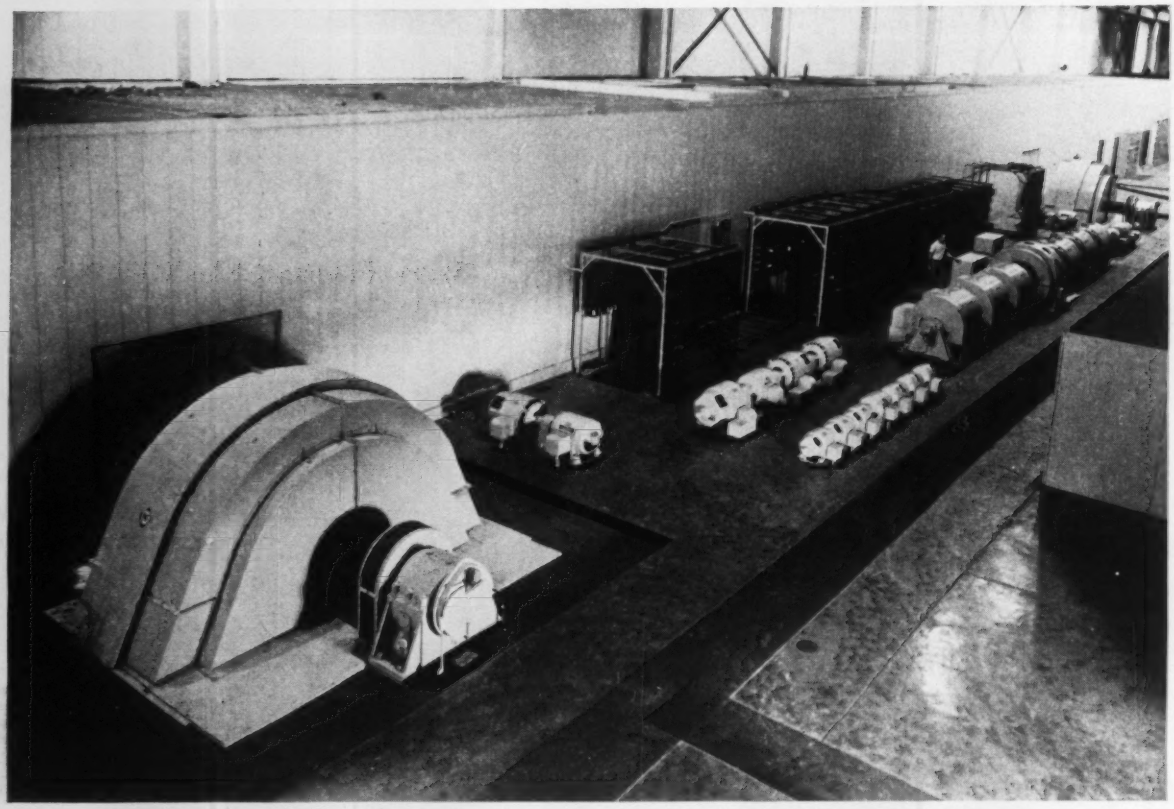
Send prints of your parts for a Gardner proposal and request new general catalog.

GARDNER

precision disc grinders

BELOIT, WISCONSIN

ALLIS-CHALMERS



Power for Kaiser Steel

Allis-Chalmers powers hot strip roughing train at Fontana

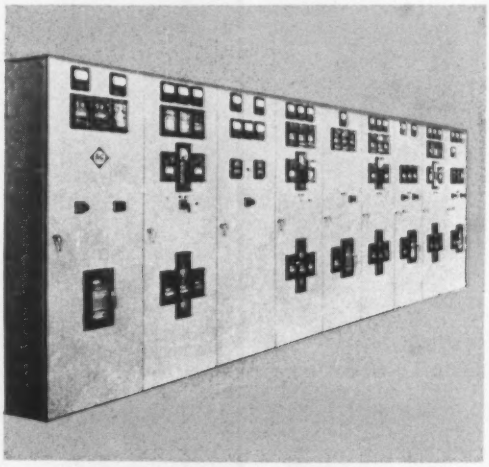
Steel companies look to Allis-Chalmers for leadership in powering hot strip mills. Reason? *Experience.* During the past 10 years, A-C has upgraded numerous finishing trains and has powered most of the roughing trains installed in this country.

Allis-Chalmers roughing train equipment at Fontana includes 6600-volt switchgear, four 6000-hp synchronous motors, one 5000-hp wound-rotor motor and one 3000-hp synchronous motor. Variable voltage control for edgers and slab squeezers was also provided, along with supporting variable voltage motor-generator sets, and dynamic braking and inching equipment.

In addition to equipment for steel mills — motors, control, switchgear, transformers, rectifiers, compressors, steam turbines, pumps — Allis-Chalmers will undertake responsibility for designing complete operating facilities. This *Systemation* service is based on processing knowledge gained as a major supplier of power equipment plus electronic control system experience gained through Consolidated Systems Corporation, an affiliate company.

For information on Allis-Chalmers power*full leadership, contact your A-C representative or write,* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.* A-1418

Systemation is an Allis-Chalmers servicemark.

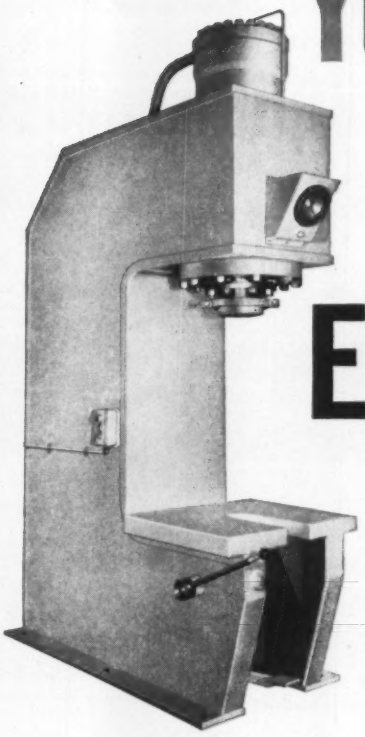


One of the lineups of 6600-volt switchgear installed at Kaiser's Fontana Works.

WANT TO SPEED FORMING OPERATIONS?

You specify the shapes...

ERIE WILL BUILD THE PRESS



When you have unusually shaped parts to position for assembling, forming, forcing, straightening and similar operations, an Erie C-frame hydraulic press may be the all-purpose machine you need. Open on three sides, the C-frame design provides maximum accessibility to the work area. It eliminates the restrictive caging normally caused by support rods or frame castings.

Custom-designed Erie C-frame hydraulic presses can be manufactured to meet unusual requirements. Both horizontal and vertical frame machines have been built for high-speed production in capacities to 500 tons.

Standard Erie C-frame hydraulic presses are also available in a range of sizes, with capacities up to 250 tons.

Erie C-frame hydraulic presses have all steel welded frames to assure a high safety factor with minimum deflection. Power units are built in. Sensitive controls include dual hand and foot levers to provide accurate operation in either direction.

For the complete story, phone or write Mr. Carl Hammon, Erie Foundry Company, Erie 1, Pa. Ask for Bulletin 370.

ERIE

ERIE FOUNDRY COMPANY

ONE OF THE GREAT NAMES IN FORGING SINCE 1895

EF-60-04

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

Take a lead from the leaders...

Since 1948, Amchem ALODINE* treated over 1½ Billion square feet

Popular Reynolds Colorweld pre-finished aluminum panels find wide application in commercial construction where its enduring performance and good looks are helping to change the architectural face of industry. Alodine contributes its protective qualities to Colorweld's amazing paint performance.

Conversion Coating Chemicals have of Aluminum in Reynolds Plants!

From 1955, when Reynolds Colorweld** Production was started, Reynolds has used ALODINE; Continue to Report Complete Customer Satisfaction with Paint Adhesion on this Quality Pre-Enameled Aluminum Product

At two Reynolds producing facilities—Atlanta, Ga. and McCook, Ill.—Alodine chemicals used in the pre-paint treatment of Colorweld offer a typical example of Reynolds' continuing emphasis on product quality.

Each day at these plants thousands of feet of aluminum are treated with Alodine to provide the metal with a chemical coating which produces high quality paint bonding characteristics so essential to the durable Colorweld finish Reynolds demands.

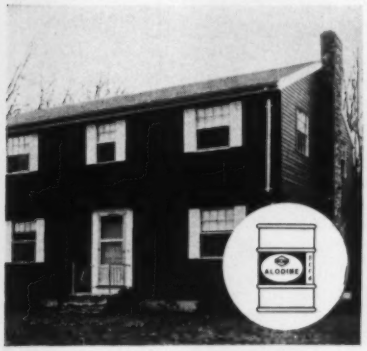
Alodine provided the first economical treatment that made possible the mechanical forming of pre-painted aluminum. Under extremely high volume processing speeds, the outstanding attributes of Alodine benefit aluminum products of all types—through improved paint bonding for subsequent mechanical forming operations, that means extra years of wear for painted aluminum under all types of environmental conditions.

Behind the success of Alodine as the outstanding pre-paint treatment for aluminum stand the research and development activities of Amchem's Metal Protection Laboratories where the search continues for even more efficient aluminum treating chemicals.

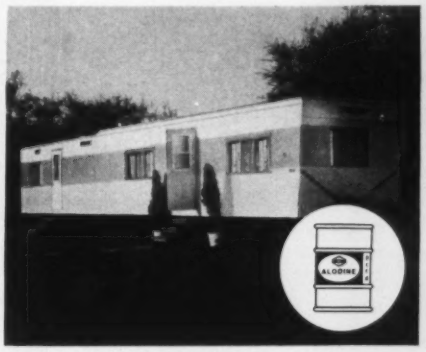
Take a lead from the leaders. If you're producing aluminum—bare or coated—specify Alodine for the assured quality and added beauty of your finished product.

*Amchem's registered trademark for its conversion coating chemical for aluminum.

**Colorweld is a registered trademark of the Reynolds Metals Company.



Beauty and durability characterize siding of Reynolds Aluminum Colorweld for home use. Alodine chemicals help provide a paint bond that lasts and lasts.



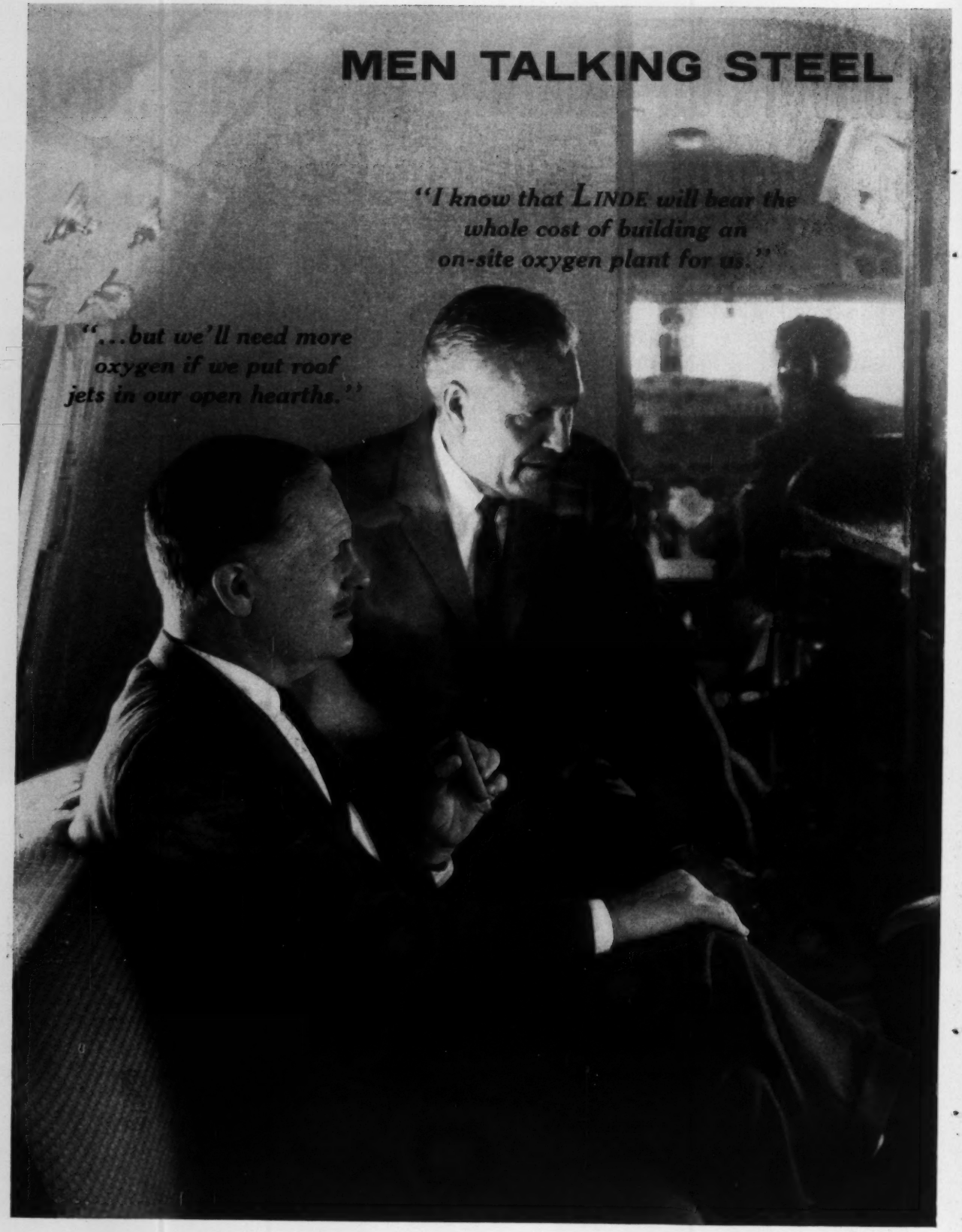
This home-on-wheels has more appeal, will last longer thanks to its body of Reynolds Aluminum Colorweld, and a firm paint bond thanks to Alodine.

At Amchem's Metal Protection Laboratories exhaustive quality control testing assures the performance of Alodine chemicals for every aluminum pre-paint requirement.

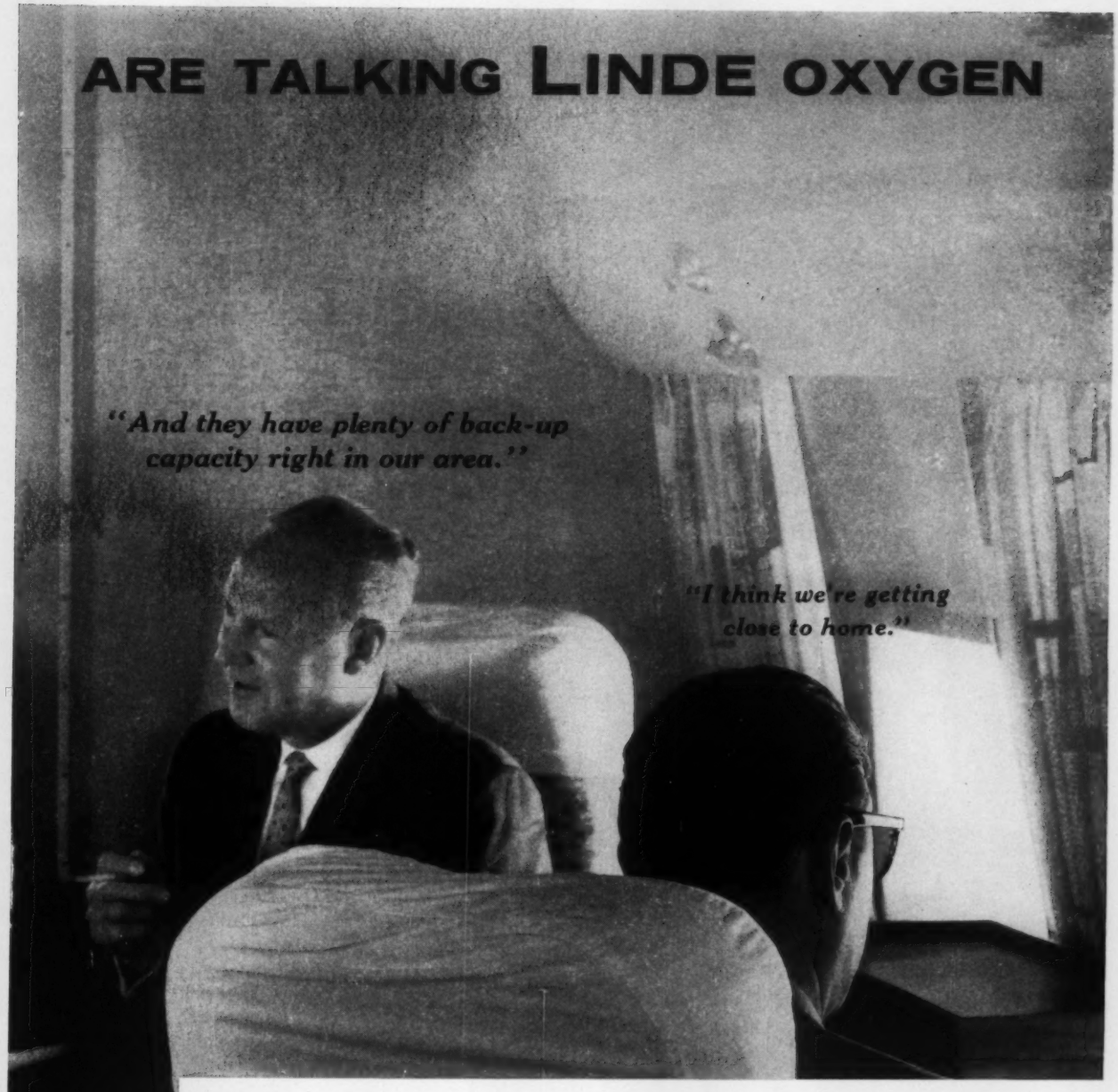
AMCHEM **ALODINE**

Amchem is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • St. Joseph, Mo. • Detroit, Mich. • Niles, Calif. • Windsor, Ont.

Write for Bulletin 1424C, gives detailed technical specifications on different Alodine chemicals available for pre-treating aluminum.


MEN TALKING STEEL
"I know that LINDE will bear the whole cost of building an on-site oxygen plant for us."
"...but we'll need more oxygen if we put roof jets in our open hearths."

ARE TALKING LINDE OXYGEN

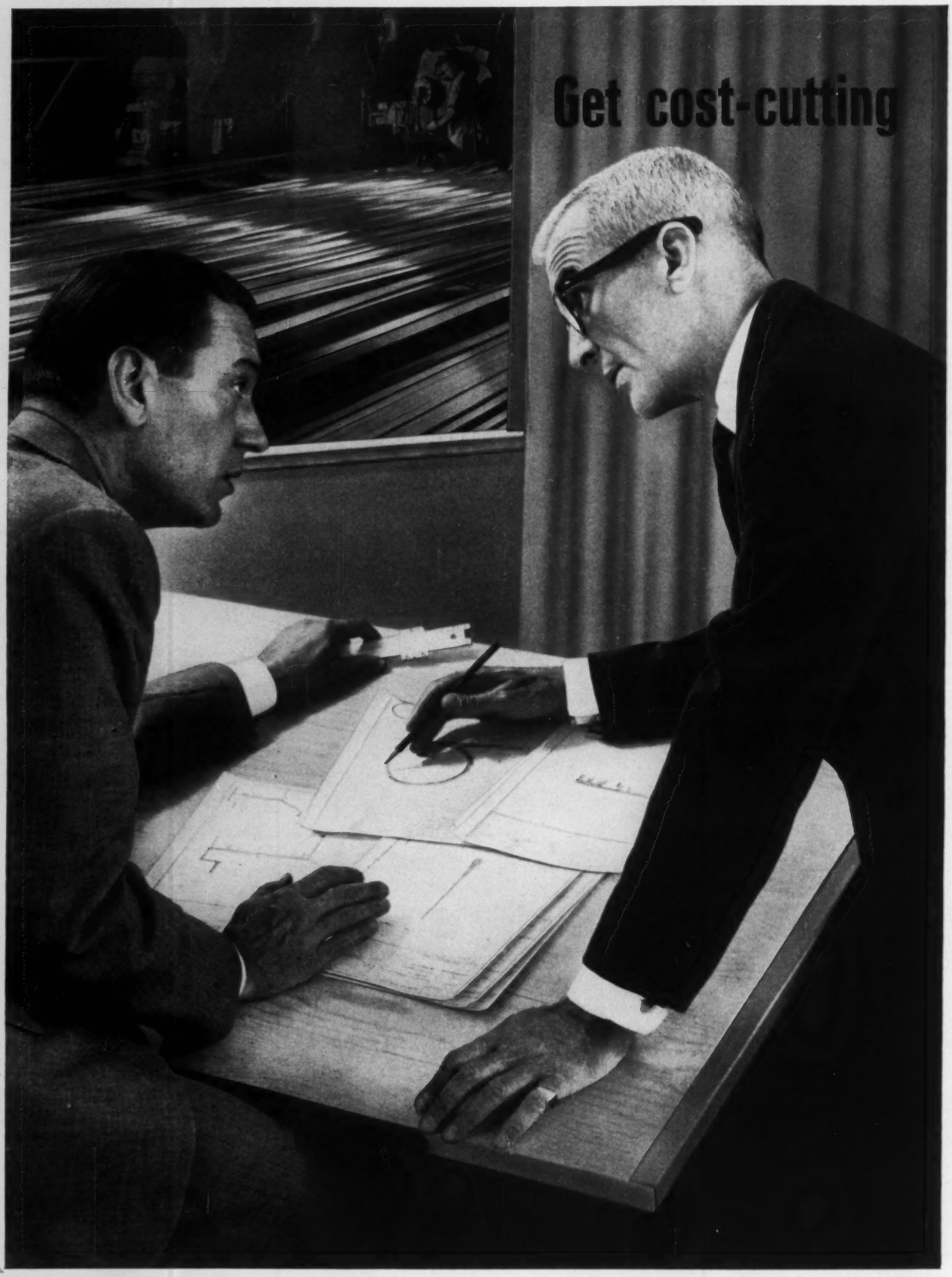


You can learn what LINDE's *total gas technology* means to on-site plants for steelmakers by writing Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada*, Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

LINDE COMPANY

UNION CARBIDE

"Linde" and "Union Carbide" are registered trade marks of Union Carbide Corporation


Get cost-cutting

engineering help when you specify extruded aluminum products

Call in your nearby independent fabricator . . .

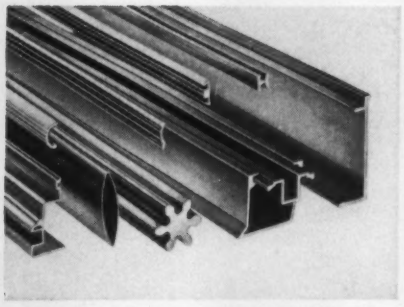
Supplied with quality ALCAN aluminum by Aluminium Limited

The practical everyday help you need in aluminum application may be just around the corner—at your nearby aluminum extruder.

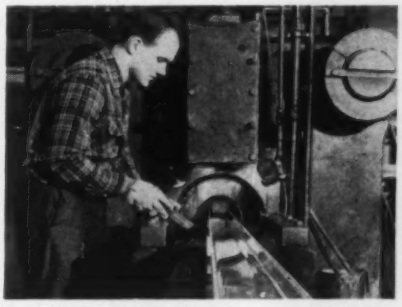
You'll find he's experienced! With knowledge gained through years of working with aluminum—he can help you design extruded shapes best suited to trouble-free production . . . peak end-product performance. He can help in alloy selection, too, offering you a wide variety of aluminum alloys formulated by Aluminium Limited.

Your independent aluminum extruder also offers more personalized service . . . your business is important to him. Even on small orders, he will give you the quality work, attention to detail and prompt delivery that assure your repeat orders.

Call in your aluminum fabricator on your next extrusion order. Let him estimate on cost and delivery. Or, if you prefer, we'll be pleased to send you a list of leading independent aluminum extruders in your area.



Any shape . . . the right alloy. Your nearby extruder can turn out aluminum in a wide range of shapes to meet your most exacting requirements. He also works with you in choosing from a variety of ALCAN aluminum alloys.



Modern equipment. Investigate the facilities offered by your aluminum fabricator—you'll find him well equipped to serve you. His facilities, experience, location, and his personalized service make him your best source of extruded aluminum products.

Fast, reliable delivery. Because he's nearer to your plant, your aluminum fabricator can arrange production schedules to suit your needs. He can also work more closely with you in estimating, planning and engineering.

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630 Fifth Avenue, New York 20, N. Y.

Gentlemen: Kindly send me a list of independent aluminum extruders in my area.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

Aluminium Limited ALCAN

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CLEVELAND • CHICAGO • LOS ANGELES
DETROIT • ATLANTA • ST. LOUIS

CLARK Centrifugal Compressors Assure 100% Availability

Typical Clark Isotemp Compressor installation with synchronous motor drive and gear located on mezzanine level.

In air separation plants throughout the world, Clark Horizontally-Split Centrifugal Oxygen Compressors are operating in 100% service. Because the Type HS Compressors are literally maintenance free, standby units have not been required. The performance of these machines has been outstanding with safety, dependability and efficiency being among the features "best liked" by operators.

Now, another centrifugal compressor has been added to the Clark line of air separation compressors. The new Clark Isotemp Centrifugal Air Compressor has been designed to provide highest purity, primary 110 psi. air for tonnage oxygen plants. Like the Type HS Oxygen Compressors, the *Isotemp* is designed for 100% availability. It incorporates many of the design features found to be so effective in the oxygen machines.

A key feature of the Clark Isotemp Compressor is the system of integral intercoolers. Built into the base of machine, they form a compact unit-engineered package. An unusually high efficiency over a wide operating range is produced by intercooling between stages, the use of closed-type impellers and volute diffusers. Single-case, horizontally-split design assures maximum accessibility and eliminates alignment problems.

If you need high purity compressed air in large volumes, the Clark *Isotemp* will provide substantial savings in capital investment, space, foundation requirements, maintenance and operating costs. The *Isotemp* is built in seven frame sizes in packages with capacities ranging from 5000 to 50,000 cfm and more. Clark Oxygen Compressors are available in matching frame sizes. Both the Isotemp and Type HS units can be driven by synchronous motors, induction motors or turbines.

For data on Clark Centrifugal Compressors and Reciprocating Compressors consult your nearest Clark representative or write for Bulletin 175 on Isotemp Compressors, Bulletin 150 on Centrifugal Oxygen Compressors or Bulletin 160 on Clark Reciprocating Process Compressors.

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Important facts to know about Laminated Plastics

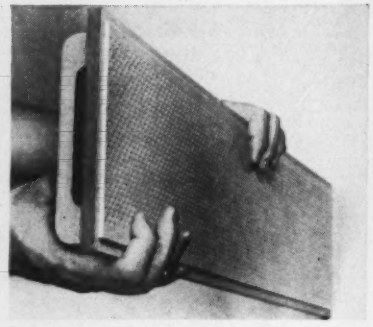
LAMINATED PLASTICS *What they are, where they can be used*

Taylor laminated plastics, also known as reinforced plastics, are thermosetting-type materials formed by impregnating paper, cotton cloth, asbestos, glass cloth, nylon or other base materials with synthetic resins and fusing them into sheets, rods, tubes and special shapes under heat and pressure. These materials exhibit a valuable combination of characteristics, including high electrical insulation resistance, structural strength, strength-to-weight ratio, and resistance to chemical reaction; also adaptability to fabricating operations.

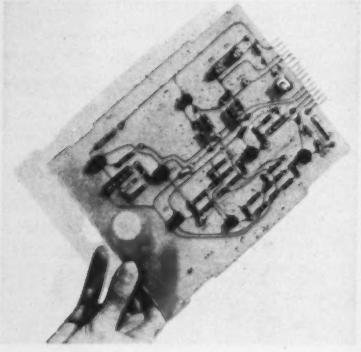
Types of laminated plastics made by Taylor

There are four basic types of Taylor laminated plastics commonly specified and used throughout industry today. They are as follows:

Phenolic Laminates. Paper, cotton fabric or mat, asbestos, glass cloth or nylon bases impregnated with phenol formaldehyde resins. These provide strength and rigidity, dimensional stability, resistance to heat, chemical resistance, and good dielectric characteristics. Some Taylor grades are excellent basic materials for gears, cams, pinions, bearings and other mechanical applications. Others are widely used in terminal boards, switchgear, circuit breakers, switches, electrical appliances and motors. Also in radios, television equipment and other electronic devices; and in missiles as nose cones, exhaust nozzles, and combustion chamber liners.

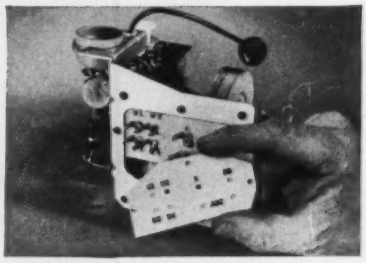


Melamine Laminates. Glass cloth or cotton fabric impregnated with melamine formaldehyde resin. Taylor melamine laminates have superior mechanical strength and are especially desirable for their arc-resistant qualities. Good flame and heat resistance, good resistance to the corrosive effects of alkalis and most other common solvents, besides other favorable characteristics. Typical applications include arc barriers, switchboard panels, and circuit-breaker parts in electrical installations.



Silicone Laminates. Continuous-filament woven glass fabric impregnated with a silicone resin. These laminates combine high heat resistance (up to 500°F. continuous) with excellent electrical and mechanical properties. They are primarily used in high-temperature electrical applications and high-frequency radio equipment.

Epoxy Laminates. Continuous-filament woven glass fabric or paper impregnated with epoxy resin. Glass-fabric grades are designed for use in applications requiring high humidity-resistance, good chemical resistance,



and strength retention at elevated temperatures. Paper grades are used under high-humidity conditions where resistance to acids and alkalis is required. Both grades are characterized by good dielectric strength, low dielectric losses, and high insulation resistance even following severe humidity conditions.

• • •

Recent technical advances in the bonding of various metallic and nonmetallic materials to laminated plastics have opened up new design opportunities. It is now possible to bond virtually any compatible material with a laminated plastic to form a composite which combines the advantages of both. One of the first composite materials was a copper-clad laminate used for printed circuits. More recent composite laminates, usually manufactured to customer specification, include the following: Taylorite® vulcanized fibre-clad, rubber-clad, asbestos-clad, aluminum-clad, beryllium-copper-clad, stainless-steel-clad, magnesium-clad, and silver- and gold-clad. Any one of these materials can be sandwiched between sheets of laminates, too, and can be molded to fit specific requirements.

Send for complete information about any or all of these Taylor laminates. And remember Taylor's new selection guide will simplify your problems in choosing the right laminate for your specific application. Taylor Fibre Co., Norristown 52, Pa.

Taylor

LAMINATED PLASTICS ■ VULCANIZED FIBRE

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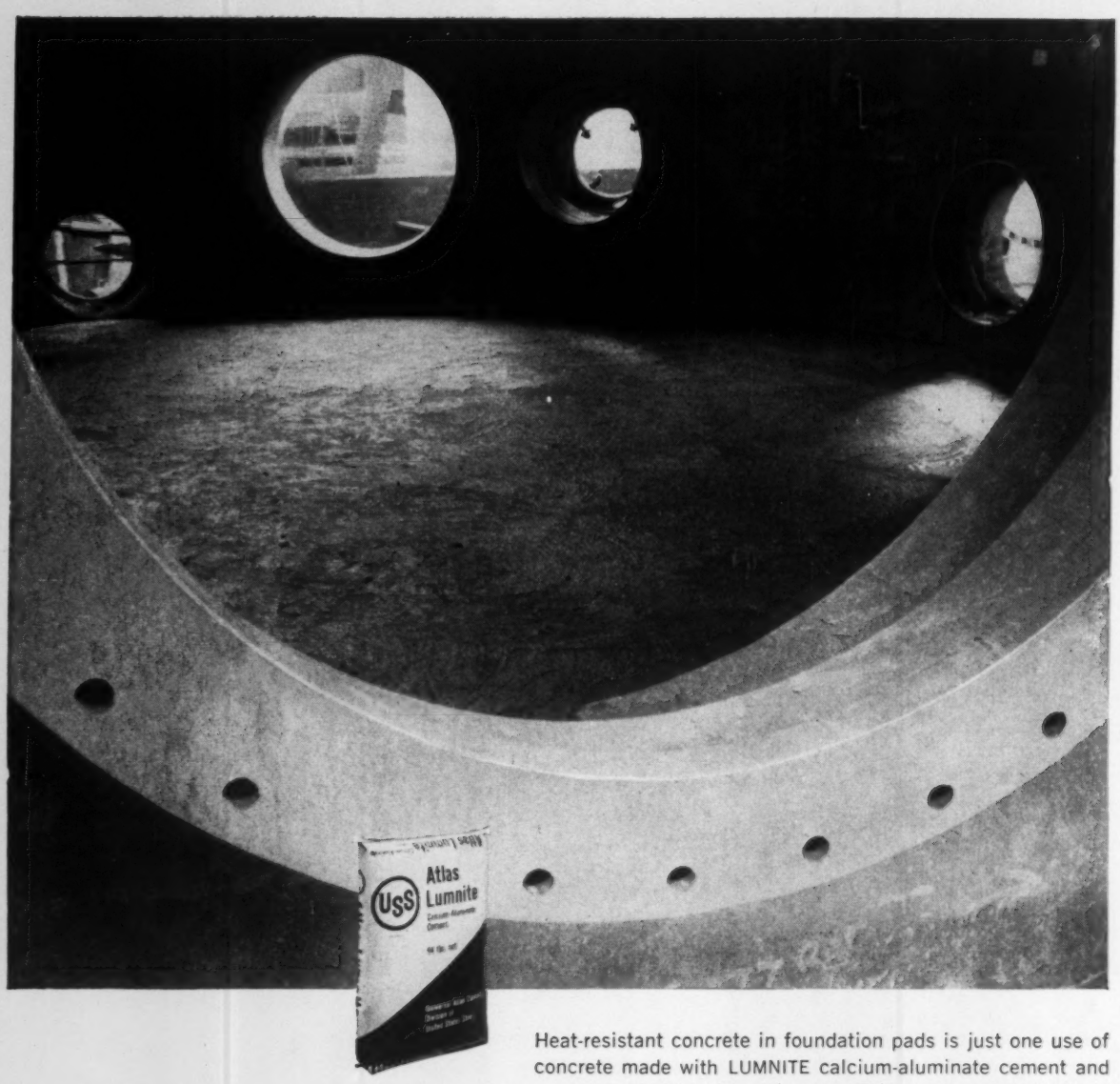

Stove pads place easier with heat-resistant concrete

Heat-resistant concrete in foundation pads is just one use of concrete made with LUMNITE calcium-aluminate cement and aggregates in blast furnace stoves. Because it resists heat and abrasion, concrete made with LUMNITE cement can also be used to line sections connecting to hot-blast mains as well as flues, doors and stacks. In addition, it can be used as dome and wall insulation. And precast shapes can be formed, for doors and manholes. Installation is fast, easy, economical—by guniting, pouring or plastering. Concrete reaches full strength in 24 hours.

Write for detailed information on aggregates, proportions and methods of making concrete with LUMNITE cement: Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

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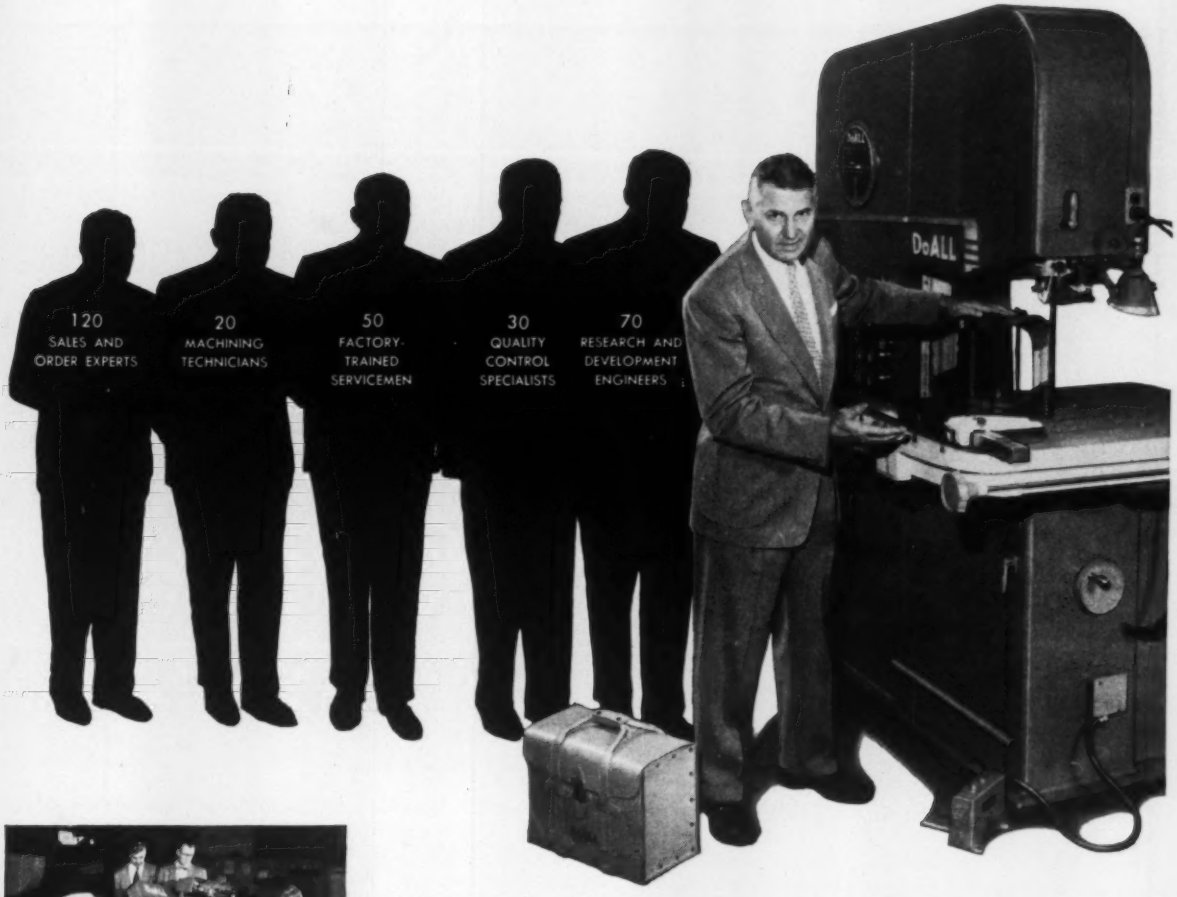

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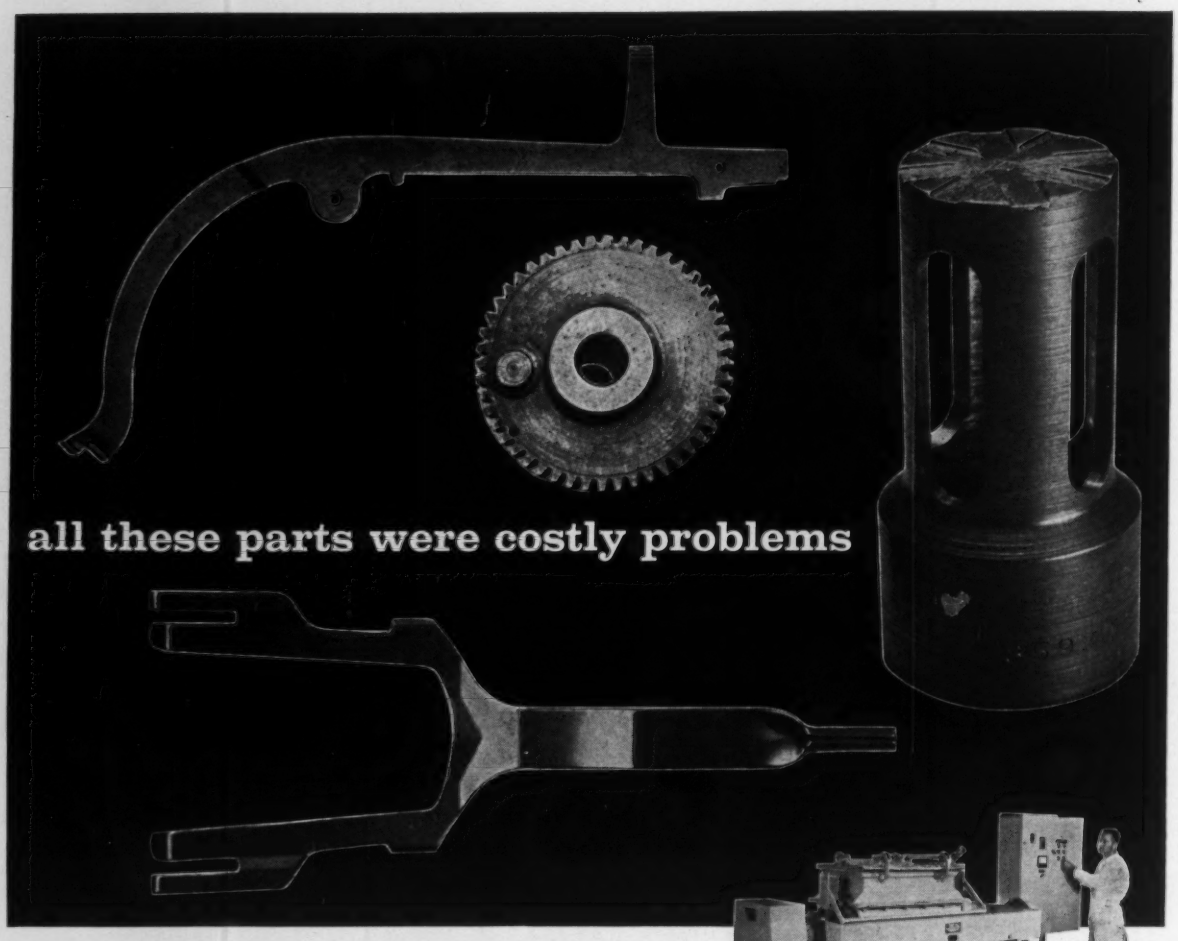

SOLVED by LORCO® vibratory finishing

You can make substantial savings in time and cost of your precision finishing operations—as hundreds of other firms have done—with LORCO vibratory finishing equipment.

LORCO vibratory machines will do any finishing operations now being performed in tumbling barrels, of course, in far less time and with invariably superior results. But most important, LORCO equipment can successfully finish parts that can not be done by any other mechanical means. All of the representative parts shown above were costly problems because of their size, shape, fragility, location of burrs, or finishing requirements. All are being finished successfully in Lorco vibratory equipment, with time and cost savings up to 90%.

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Our vibratory finishing laboratory stands ready to prove the savings you can make on your toughest finishing problems, with Vibratory finishing. See your Lorco representative or write to Lord Chemical & Equipment Division of Wheelabrator Corporation, 2068F So. Queen St., York, Pa.

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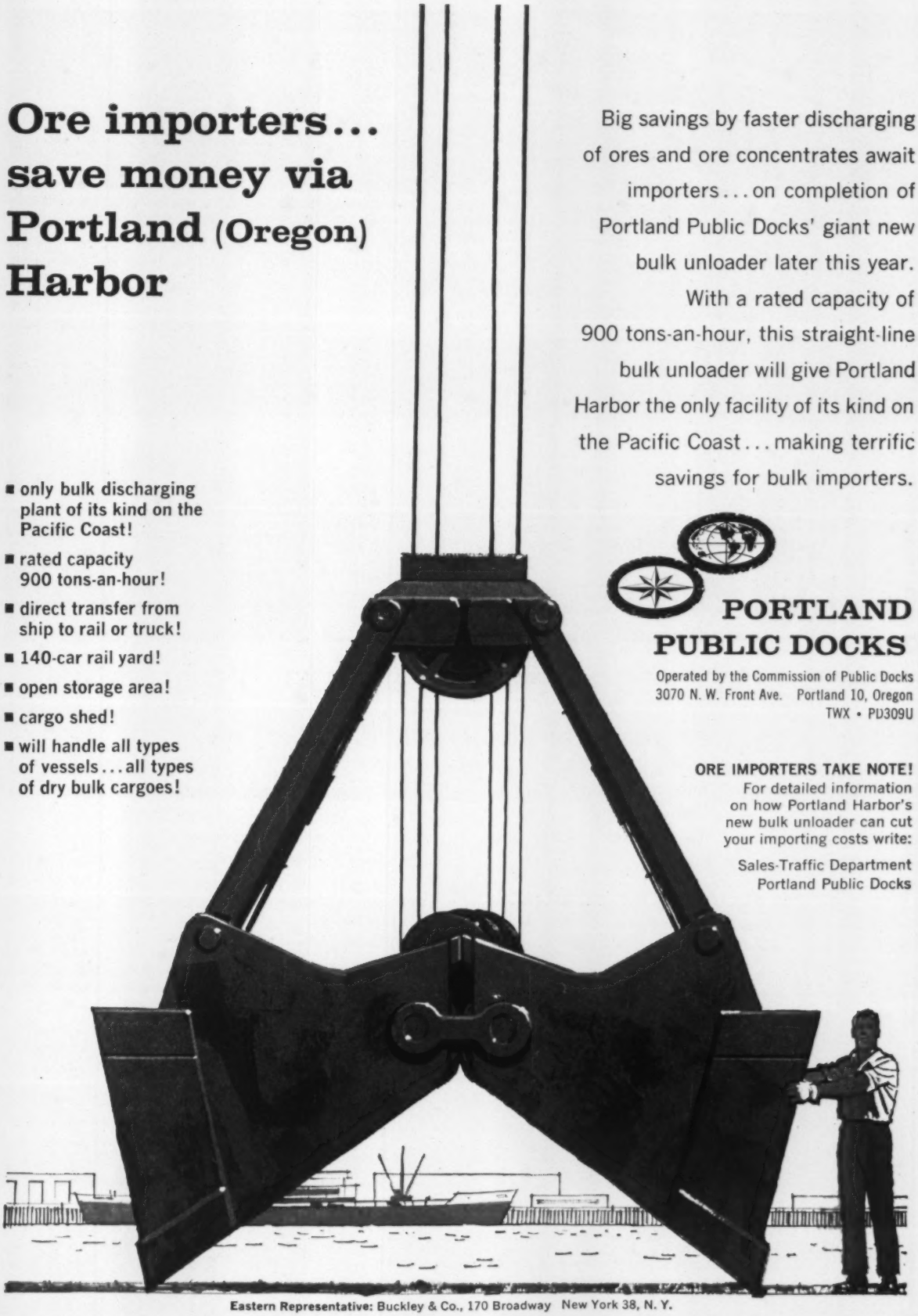

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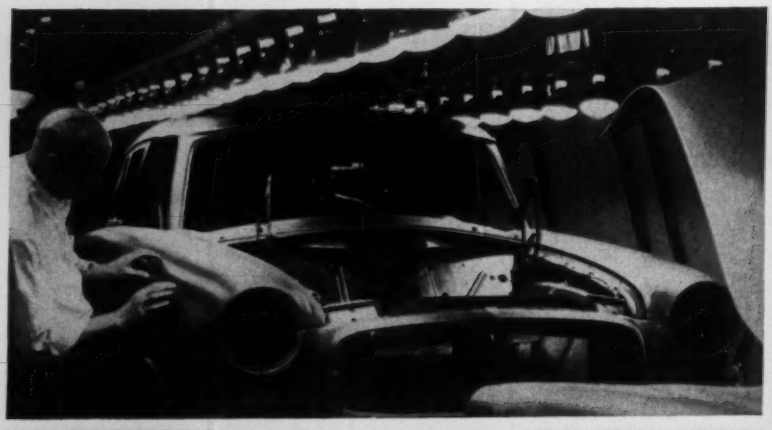

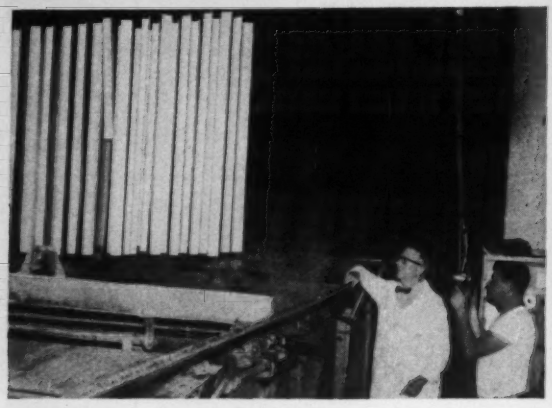

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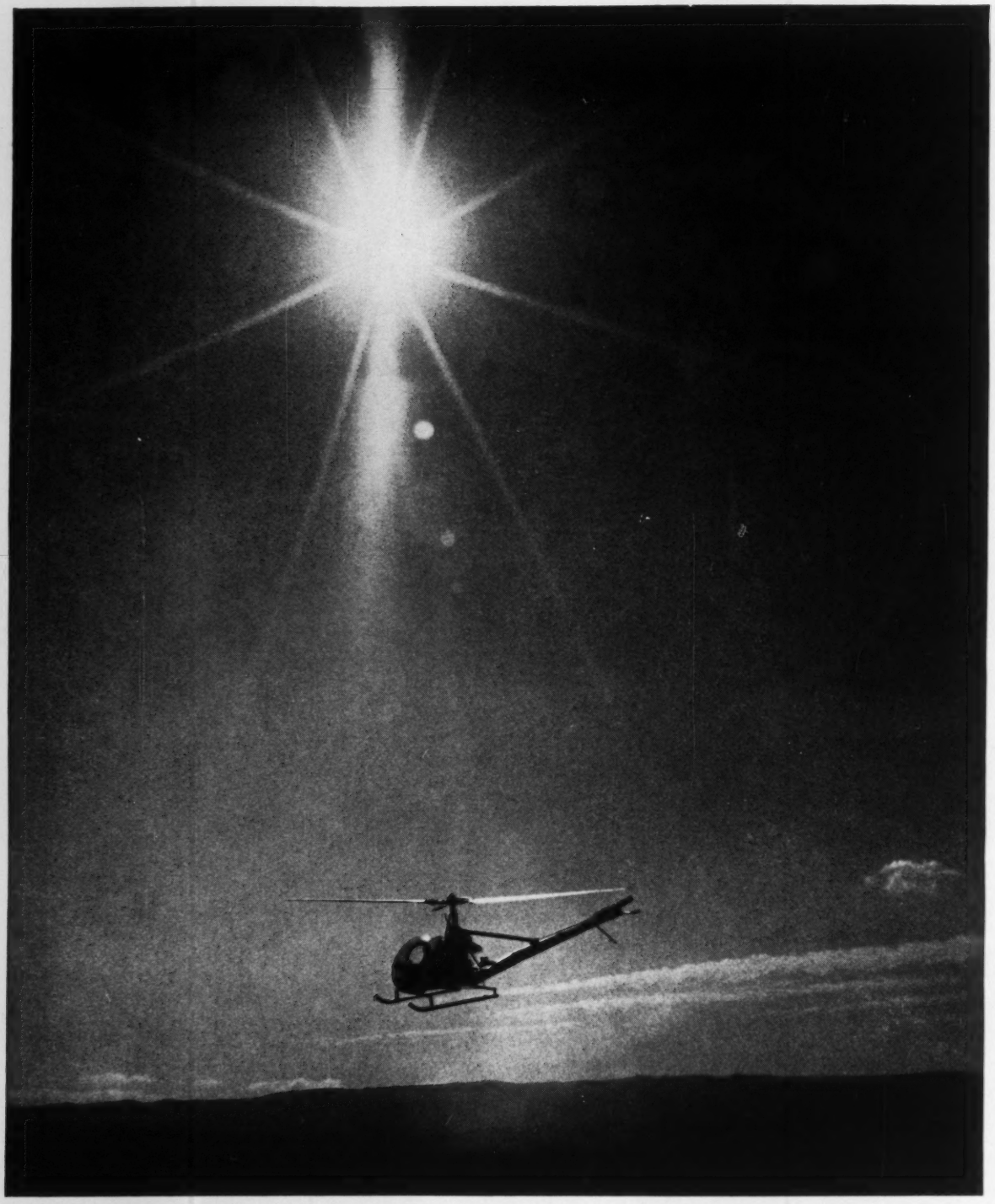

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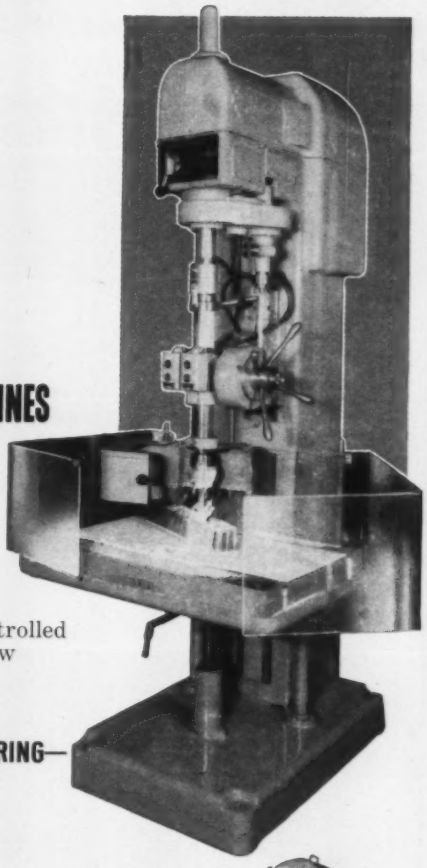

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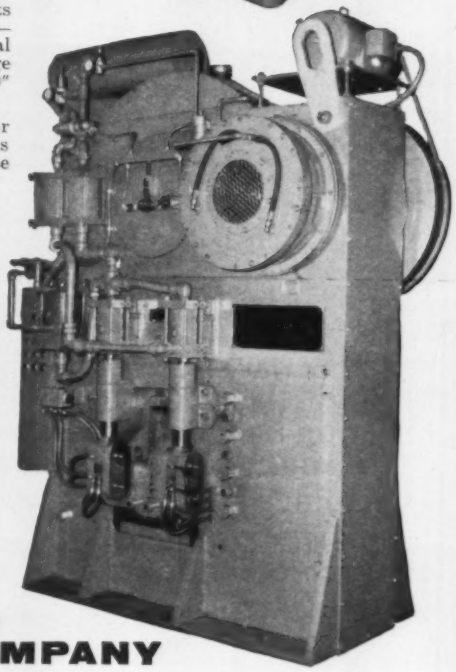

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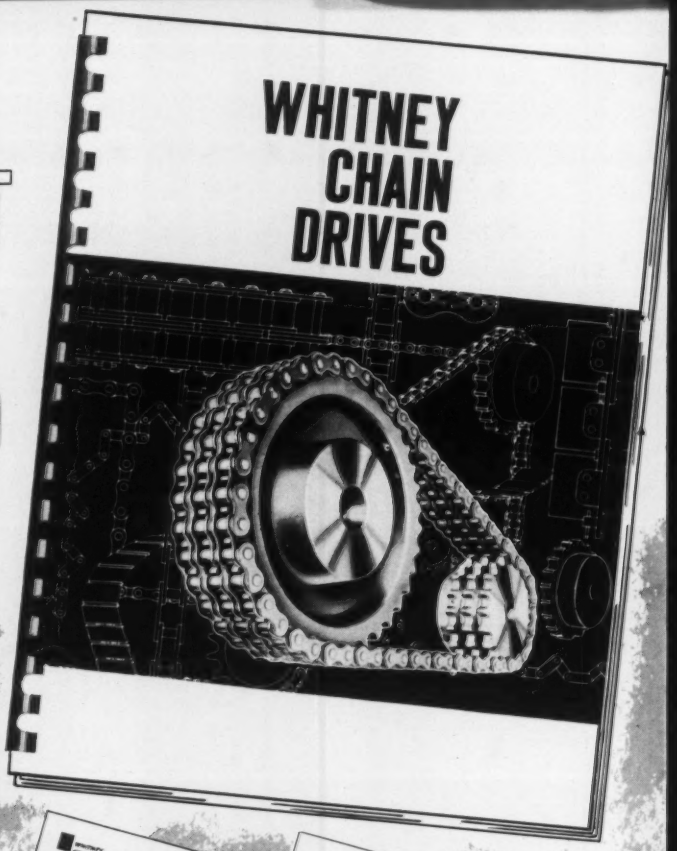

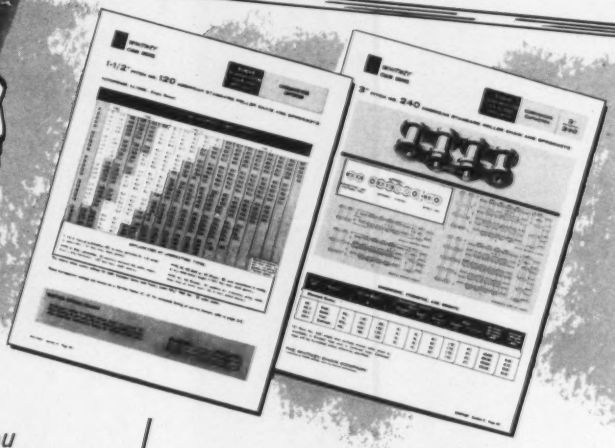

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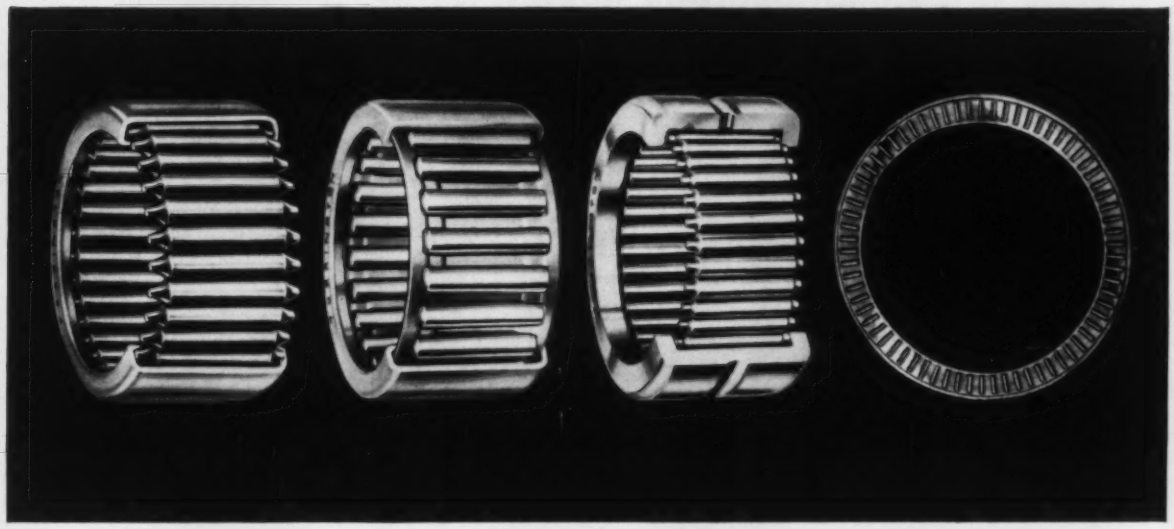

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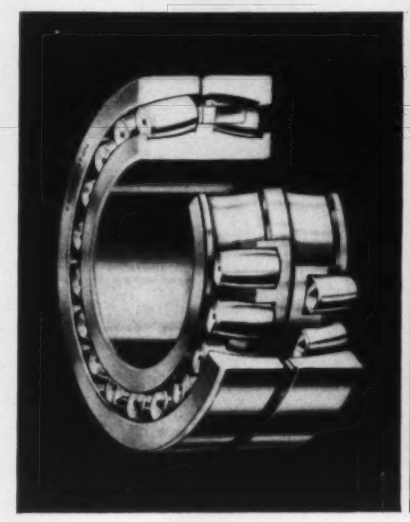

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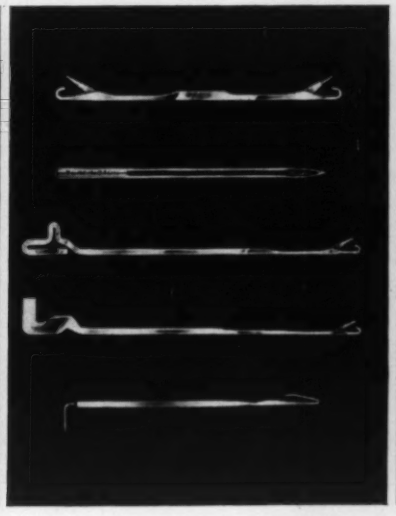

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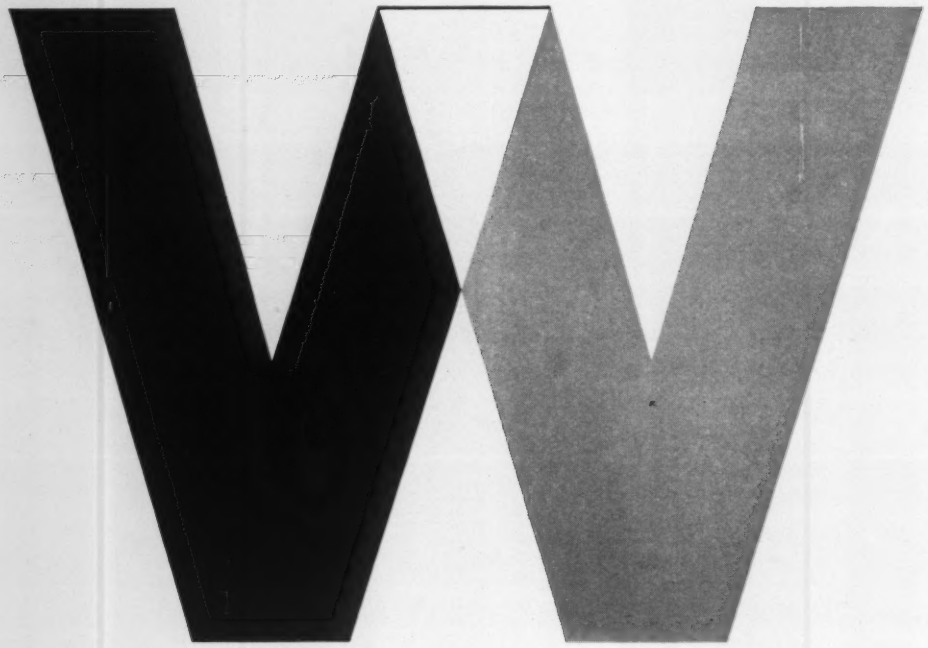

What are the Vital Values you want in the equipment you buy? If it's Vital Quality that keeps the machine operating long after others have failed, try Wheelabrator. If it's Inventiveness that solves your problem most completely and profitably, try Wheelabrator. If it's Vital Service that helps you get the most out of your equipment and people, try Wheelabrator. Wheelabrator puts the "Vital Values" in its Blast Cleaning and Dust and Fume Control equipment that mean bigger savings and better performance for you. Ask for the Wheelabrator story.

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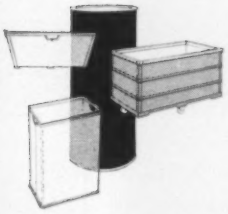

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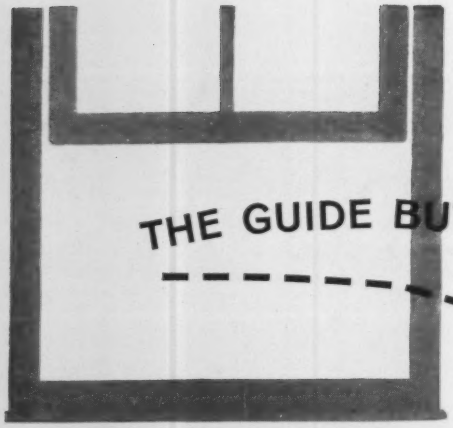
SPAULDING FIBRE COMPANY, INC. • 310 Wheeler Street, Tonawanda, N. Y.

Materials Handling Division, Dover, New Hampshire

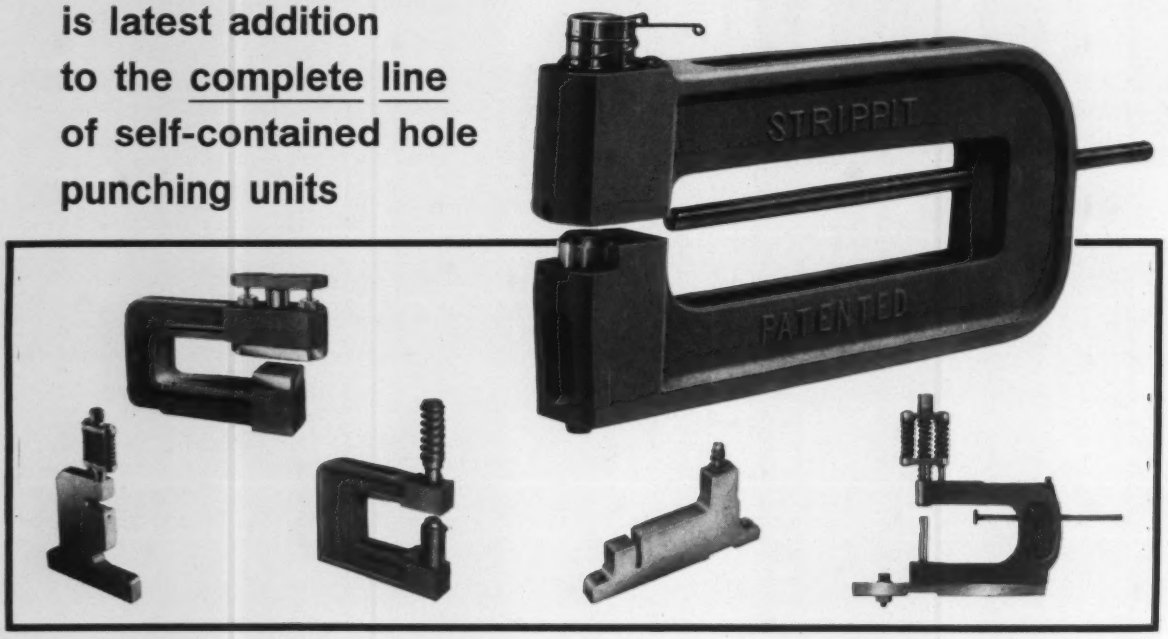


Wales STRIPPIT's new "BN" units have been designed for use *with or without* a guide button. Now, with this exclusive feature, only a punch and die (round or shaped) are required when you change from one hole size to another. For special applications and for optimum hole quality, the option of using a fitted or closed guide is still available.

THE GUIDE BUTTON GOES OUT THE WINDOW

NEW STRIPPIT "BN" SERIES

is latest addition to the complete line of self-contained hole punching units



Only STRIPPIT's "BN" units offer all these features:

- Use of fitted or closed guide button optional.
- All holders keyed for *both* round or shaped punches and dies.
- Self-storing keys supplied with each holder.
- Streamlined holder permits punching closer to leg of formed flanges and angles.
- New die section design permits easy removal and rotation of die without removing holder from set-up and retains the advantages and strength of one-piece construction.
- New threaded gage rod positions work more accurately and positively.
- All units, including ¾" unit, have hold-down slots for easier mounting.
- New stripping guide slips out quickly and easily without taking off retainer clip.
- One-piece oil hardened tool steel punches.
- Series expanded to include maximum hole size of 3½" in 10 gauge material.

WALES **STRIPPIT** INC.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

202 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

In Continental Europe: Raskin S. A., Lausanne, Switzerland *In the British Isles: E. H. Jones (Machine Tools) Ltd., Hove, Sussex, England*

SAVE SPACE, SAVE WEIGHT,

SAVE MONEY!

Dyna V

There's a *difference*, as you can see! The 10-groove D-section sheave in the foreground is replaced with the narrow 8-groove 5-V Dyna-V sheave on the line shaft. *Same power*, in a far more compact installation, with a $477 difference in price. And big future savings in belt replacement costs!

Everyone is going Dyna-V! Thousands of installations reveal that Dyna-V performance is *even better* than promised when we first introduced this new compact drive. In medium and high horsepower ranges, savings go as high as 30%!

Dyna-V can handle 3 times as much power in the same space. Dyna-V Sheaves decrease shaft overhang, increase bearing life. And Dyna-V Belts possess *all* premium qualities. Conditions requiring static conductivity or resistance to oil, moisture and heat are met by Dyna-V's one grade—the finest. Ask your Dodge Distributor, or write us for complete drive bulletin. Dyna-V Drives are available for capacities from 1 to 1500 hp.

Dodge Manufacturing Corporation, 800 Union St., Mishawaka, Ind.

The Products with the Pluses...

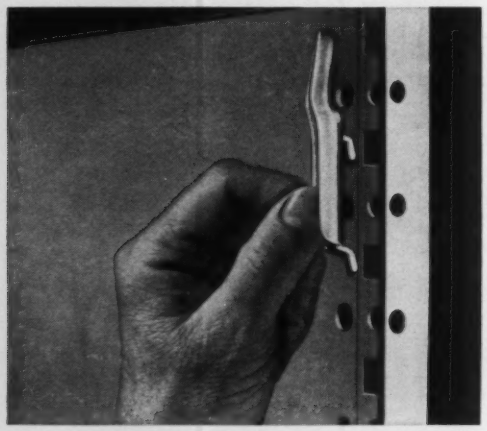
DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.

Republic Steel Lockers were selected by a leading West Coast manufacturer for their new wash-change-dress facilities. Republic Box Type Lockers on the outer wall are used for storing and protecting valuable employee tool kits. For complete planning and installation assistance, call your Republic representative, or write today.

THE NEW REPUBLIC SHELF CLIP is designed to ease and speed erection: to provide quick rearrangement of parts without dissassembling the unit; and to assure a sturdy, rigid, installation. Republic Clip Shelving saves valuable floor space, saves time and money too. Call or write for more information.



REPUBLIC METAL LUMBER® provides faster, stronger, safer framing in any application where common building materials are now used. Simply measure, cut, assemble. Stronger, safer—fabricated from cold rolled steel for high strength-to-gage ratio. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Send for attractive brochure.

good locker planning starts with

REPUBLIC STEEL LOCKERS

Good locker planning—attractive wash-change-dress facilities—pays-off in improved employee relations and increased production. And, good locker planning is easy with Republic Steel Lockers.

Republic's Berger Division Planning and Engineering Service will help you all the way. They will outline a floor plan to utilize your valuable floor area, and they will recommend the proper Republic Steel Locker for your operations. They will give you a firm delivery date, and assume full responsibility for complete installation.

Republic Steel Lockers offer industrial management decided advantages in service and economy, too. Big and roomy interiors are spacious and well designed for convenience and good ventilation. Strong and sturdy, made of steel to assure complete protection of personal effects and tools.

Bonderized! This Republic feature provides a superior base for the baked enamel finish. Offers protection against rust and corrosion—restricts bumps, scratches, abrasions of everyday service to the site of the injury. And, reduces maintenance costs to a minimum.

Republic Steel Lockers are available in a wide range of sizes and styles with box type lockers attached or separate for protecting tool kits. Your choice of any of the popular locking devices.

To learn more about the many advantages of Republic Steel Lockers, call your Republic representative. Or, write direct.

Steel Strong . . . Modern . . . Dependable

STANDARD REPUBLIC MATERIAL HANDLING UNITS move raw materials and parts through production lines to shipping faster, easier. Strong, sturdy Republic Units are designed to withstand abuse of everyday, workday service. Let Republic's Berger Division Material Handling Specialists work with you in solving material handling problems. Write for more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

☐ Republic Steel Lockers ☐ Republic Clip Shelving
☐ Republic METAL LUMBER® ☐ Material Handling Units
☐ Please have a Republic representative call

Name_____ Title_____

Firm_____

Address_____

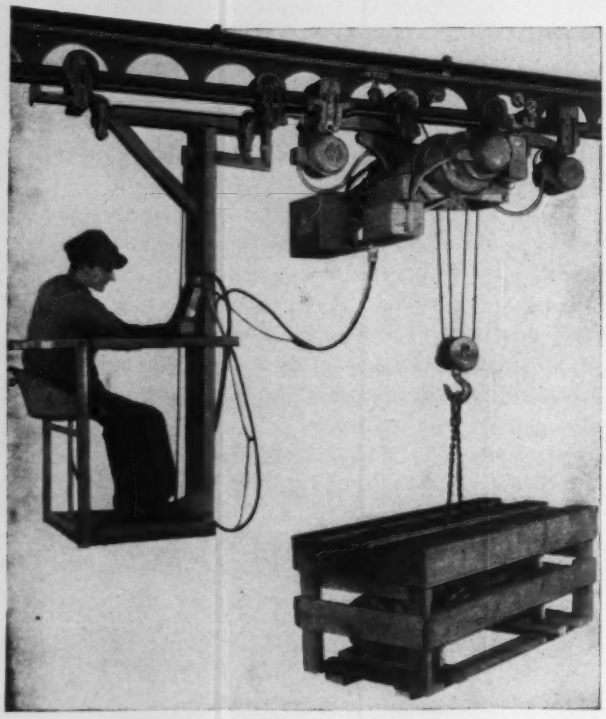
City_____ Zone____ State_____

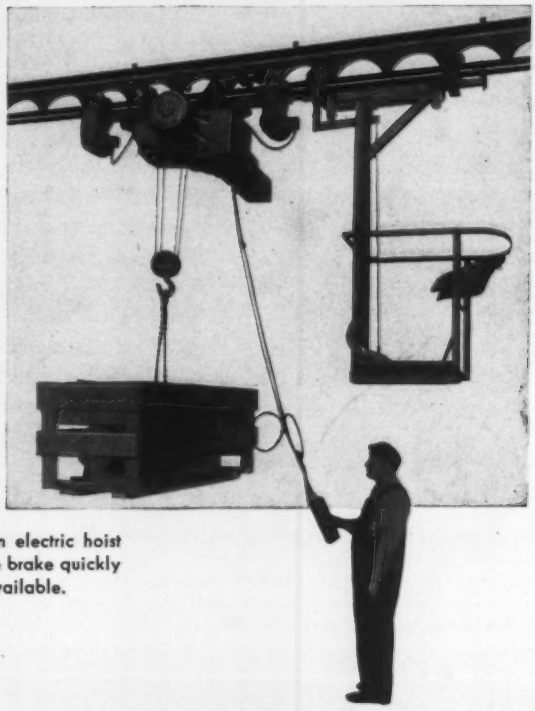
HOIST CARRIER OPERATED FROM FLOOR OR PLATFORM

Sometimes the need arises for a Tramrail unit that can be operated from either the floor or platform. The carrier illustrated, was designed to meet such a requirement.

For distant runs the operator takes the platform position; for local handling such as unloading trucks, he controls the unit from the floor.

The carrier is also advantageous where considerable material must be moved during some periods and relatively little during others. For instance, during the hours of the day shift when activity is high, two men might be employed at materials handling, one on the carrier platform and the other on the floor, hooking and unhooking the loads. During the other shifts when activity is light, all handling can be done with the Tramrail unit by one man on the floor.





• The unit illustrated is propelled by two motors and has an electric hoist of 4000 pound capacity. A foot-operated under-rail shoe brake quickly stops or holds the unit in place. Heavier capacity units available.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4810 East 284th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Courtesy Bannock Steel Company

Maintenance negligible

ON 6 YEAR OLD CINCINNATI® SHEAR

"We have had this Cincinnati Shear in almost constant operation for something over six years," says S. L. Cate of Bannock Steel Company, Pocatello, Idaho, "and, to date, maintenance costs have been almost negligible. We certainly feel this is truly a remarkable performance."

Bannock Steel Company recently installed a new Cincinnati Hydraulic Press Brake—clear evidence of their confidence in the Cincinnati line. See our insert in Sweet's Machine Tool file.

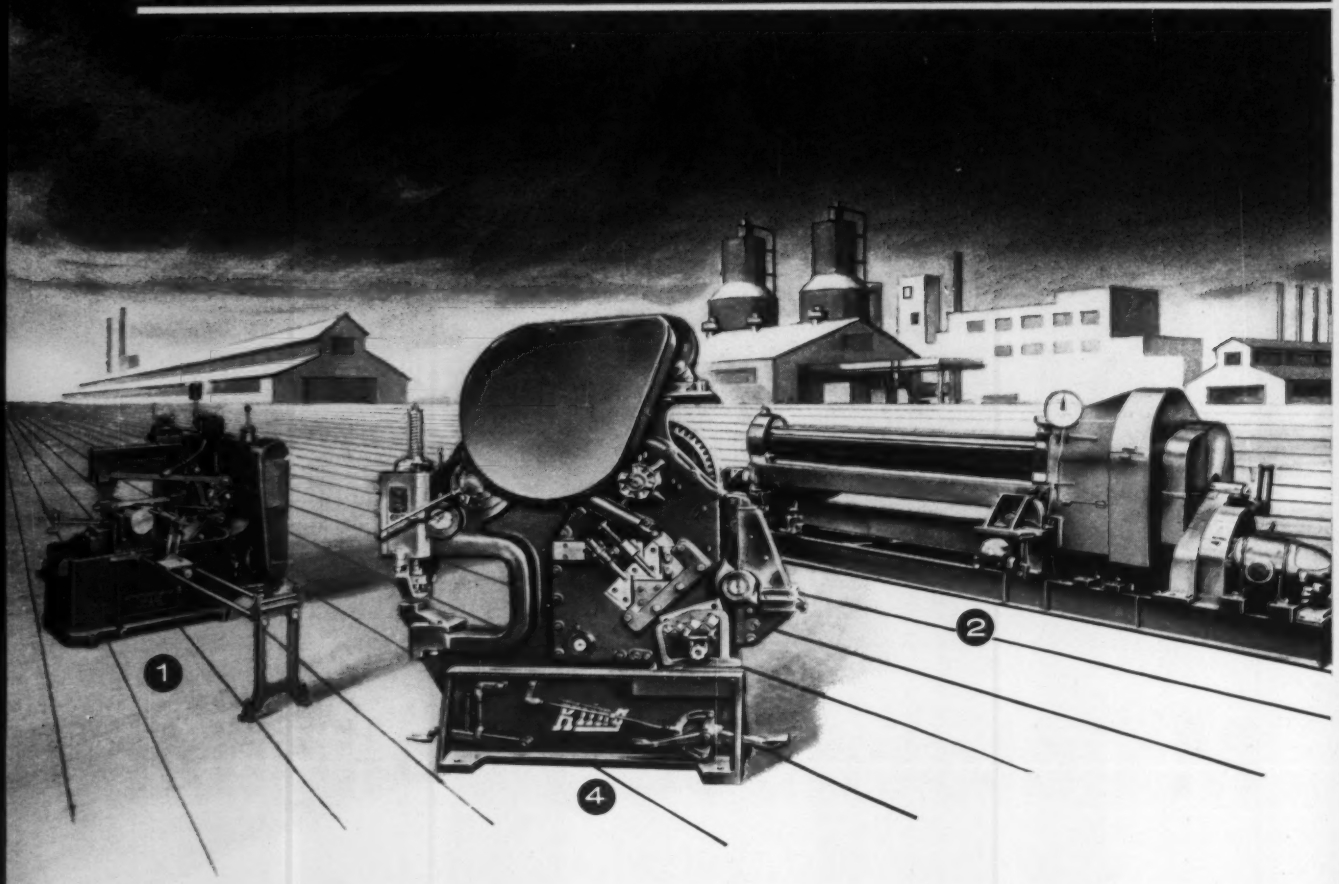
THE CINCINNATI SHAPER CO.

Shapers / Shears / Press Brakes Cincinnati 11, Ohio, U. S. A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

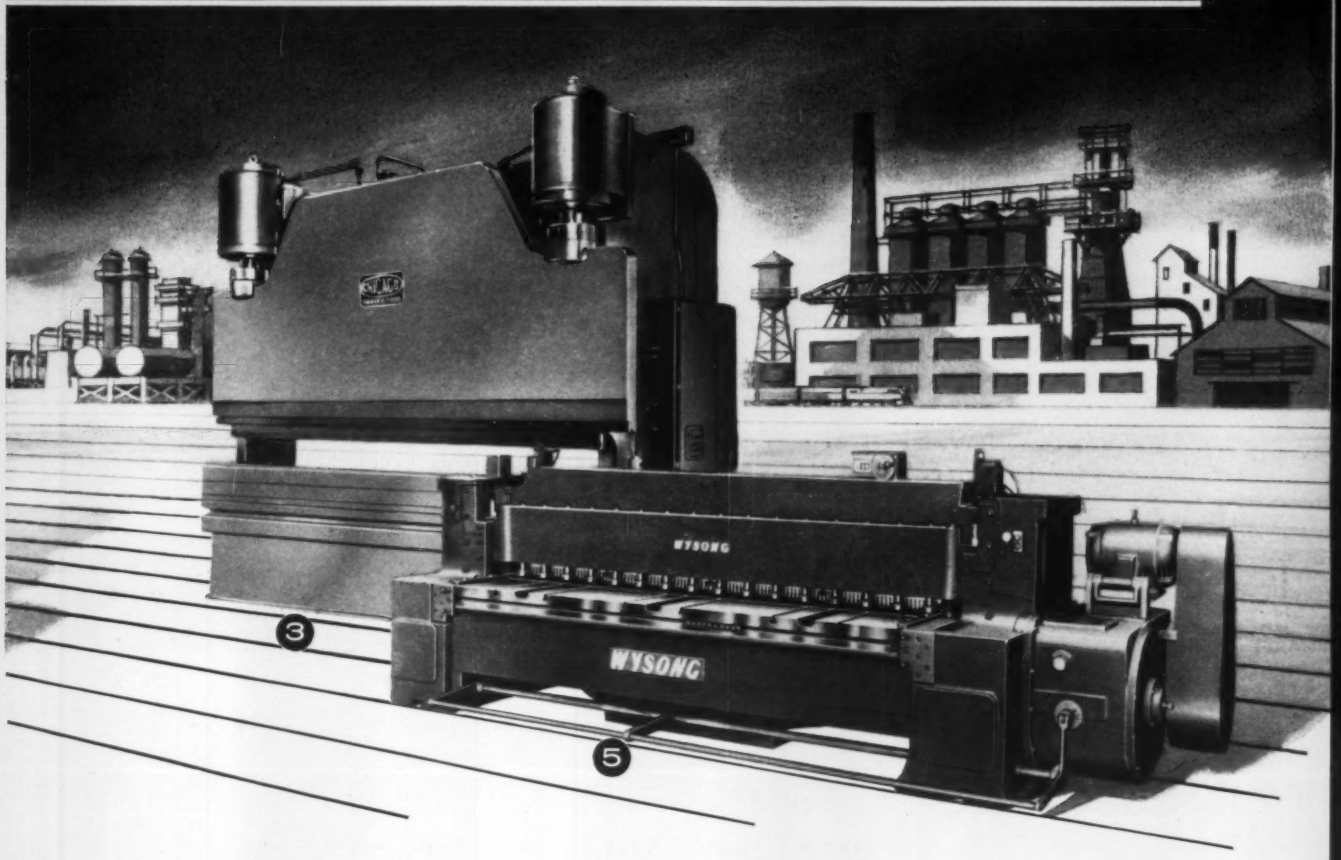
5 REASONS WHY RYERSON IS . . . .

your most complete source



1. **ARMSTRONG BLUM MFG. CO.** Full range of high-speed and general-purpose hack saws, plus regular and high-speed vertical band saws.
2. **BERTSCH & CO.** Plate bending rolls in a complete range of capacities, and overdriven squaring shears for material from 10 gauge to 1¼" thick. Also straightening rolls and culvert-making machines.
3. **DRIES & KRUMP MFG. CO.** Mechanical and hydraulic press brakes from 11- to 2000-ton capacity. Also full line of hand and power apron brakes, straight side presses, and special bending machines.
4. **KLING DIVISION, HILL ACME CO.** Famous for its combination shear-punch and coper, and for a complete line of punches, bar and angle shears, rotary shears, friction saws, bar and angle rolls, bulldozers and structural mills.
5. **WYSONG AND MILES CO.** Underdriven squaring shears for material from 18 gauge to ½" thick, also sheet metal rolls.

for metalworking machinery



No other single supplier of machinery for metal fabrication can offer you the range of types and models available from Ryerson. So, with no other supplier can you be so sure of getting exactly the right machine to do each fabricating job best at lowest cost.

We represent nearly 100 manufacturers, each a recognized leader in its field. The five featured on these pages represent five good reasons why it will pay you to call in a Ryerson representative when you're considering a machinery purchase. His recommendations are backed by Ryerson experience gained in supplying metal *and* the machinery to fabricate it for over a century.

Our complete line includes equipment for bending, braking, forming, hoisting, drilling, pressing, punching, rolling, sawing, shearing, threading and welding.

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

New marketing assistance for

New Basic Market Map . . . an essential adjunct to any marketing program. Emphasizes the 86 industrial areas in 20 states accounting for more than 90% of metalworking plant employment. No trouble visualizing sales areas because the big markets are printed complete with latest plant and employment figures.

New Basic Metalworking Data . . . for years the most popular private census of the metalworking industry, now your key to The Smart Sell in the Sixties. You can concentrate your sales efforts on the plants that pay off by taking advantage of this latest information on every metalworking plant with more than 20 plant workers in the nine important metalworking industries. Data are summarized nationally, by states, and by industrial area. Plants are listed by 2, 3, and 4-digit SIC codes with actual employment figures. There's complete information on secondary producers in each 4-digit SIC group by industrial area. And plants are tabulated for all basic metalworking operations.

But there's more to marketing than the figures. Iron Age marketing and sales techniques are field-proved. They've been used for years by outstanding companies to locate markets, establish market potential, analyze distribution channels, set-up sales territories, and measure sales performance. These down-to-earth marketing techniques are set forth in detail in the encyclopedic introduction to the new volume of data. An unequalled text in practical shirtsleeves marketing, the introductory section is being reprinted separately for wider distribution through your company.

The Smart Sell

Two New Master Lists of metalworking plants bridge the gap between market research and sales planning . . . helping you convert the statistics describing your markets into the names, addresses, and characteristics of flesh and blood companies. If you purchase the Master List, you'll receive two volumes. One, arranged by company name, is ideal for coding sales records. The other, is arranged by SIC codes, then alphabetically by states, for converting statistics into prospects. And the price includes annual updating.

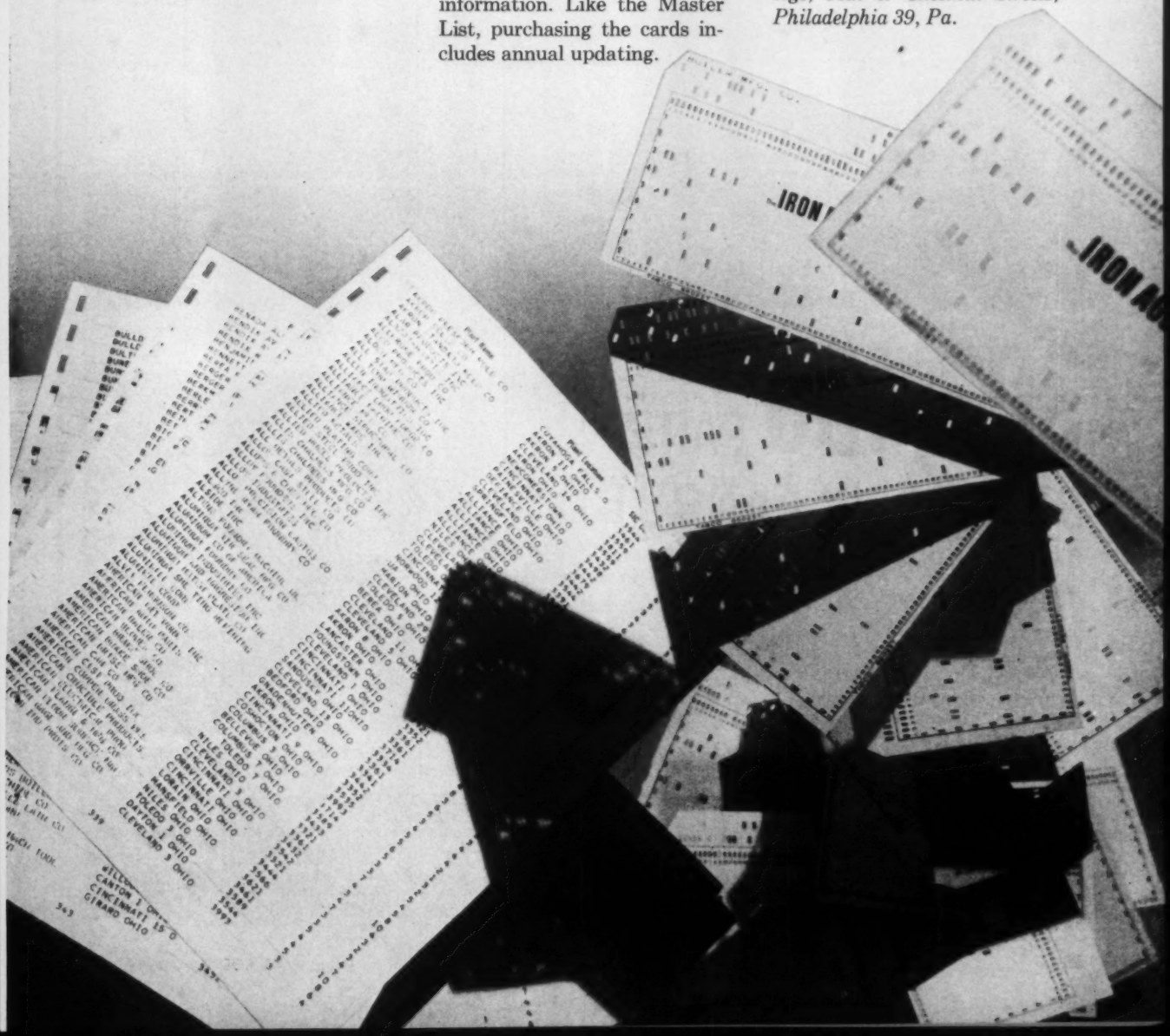
Automated Market Planning is yours with the Master List on IBM cards . . . at least to the extent of sorting and tabulating the necessary statistics. Once you decide on the market characteristics, you can have IBM equipment build a prospect list on the basis of industrial area, geographical location, primary or secondary products, employment code plant workers, departments operated, or any combinations. The new two-card deck includes departments operated, has 44 open columns you can use for coding your own sales information. Like the Master List, purchasing the cards includes annual updating.

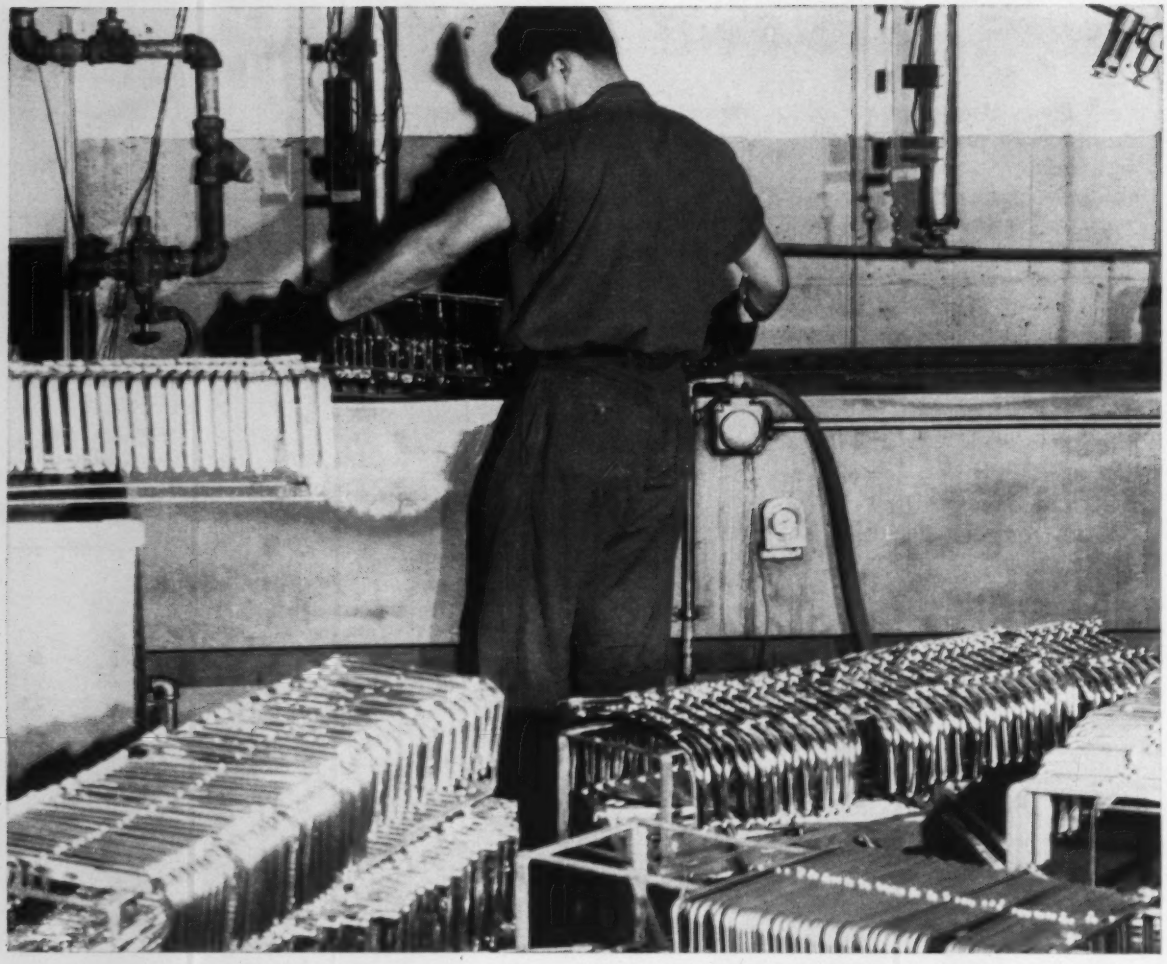
IRON AGE

$

a chilton publication

There you have the barest essentials of the Iron Age 1961 Market Planning Package. *Not just a theory . . . not just numbers, but a practical, proved basis for your marketing program to metalworking. Get in touch with your local Iron Age representative, for details. Or, write Iron Age, 56th & Chestnut Streets, Philadelphia 39, Pa.*





Metgal Novelty Company, Richmond Hill, L. I., degreases metal handbag frames.

302,400 PARTS BEFORE CLEANOUT

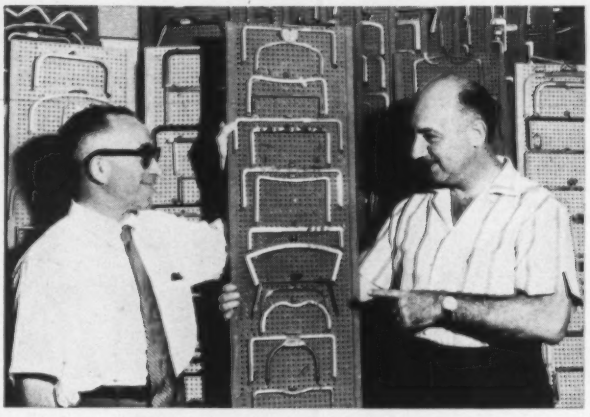
Metgal Novelty Company degreases thousands of metal handbag frames each week with Nialk® TRICHLORethylene.

It's not a simple cleaning job. Besides grease, they have to remove insoluble buffing compounds from the work. The metal might be brass, steel, plated copper or nickel plate.

The tanks "never go acid," says Sal Romano, co-owner. The stabilizer in Nialk TRICHLOR has *psp*—permanent staying power. It lasts, doesn't weaken between cleanouts. Since they get complete recovery of stabilizer on cleanout, they never have to add fresh stabilizer.

Regular tank checks are important to Metgal, too. Romano says, "Hooker and its local distributor, H. Harrington & Company, keep an eye on our operation so there is no undue loss of solvent."

Regardless of the metals you're working with, Nialk TRICHLOR can help solve your cleaning problems and save you money. Hooker's experience is yours for the asking. Call or write us about your problems or see your chemical distributor.

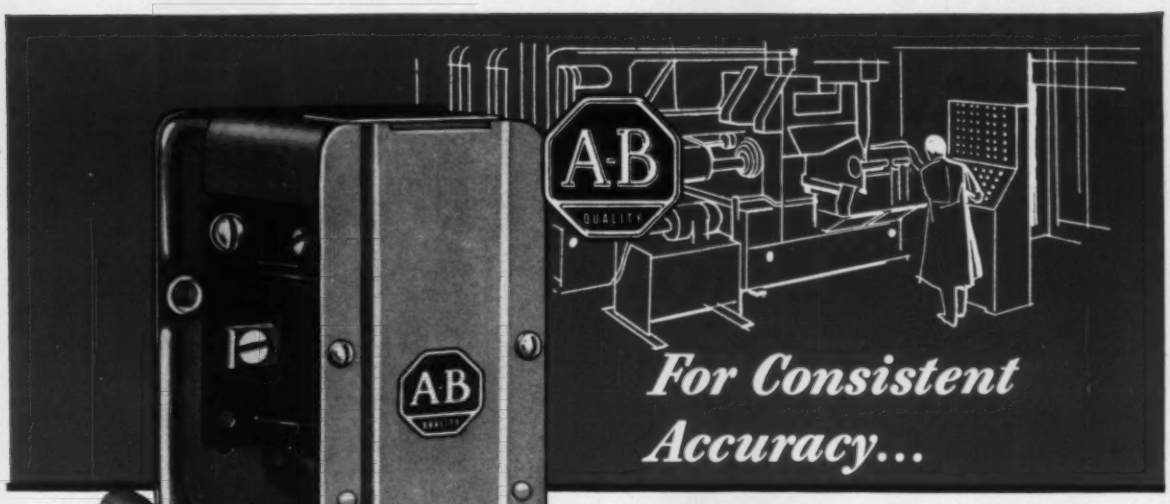


Henry Green (left), designer for H. Margolin & Company, leading handbag producer, and Richard Romano, Metgal co-owner, look over a display rack of handbag frames.

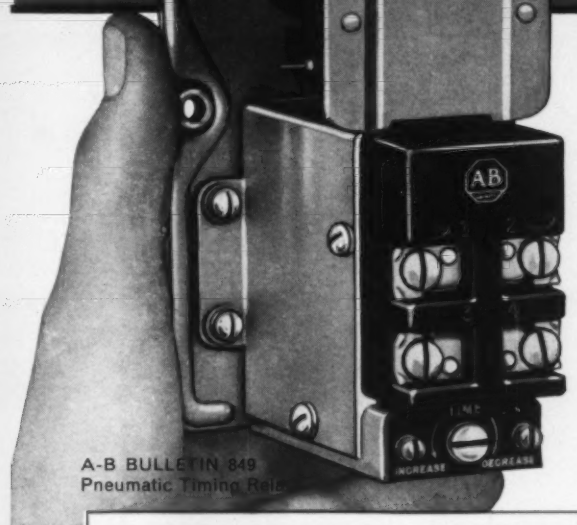
HOOKER CHEMICAL CORPORATION
302 Union Street, Niagara Falls, New York

Sales offices: Buffalo Chicago Detroit
Los Angeles New York Niagara Falls
Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B.C.

HOOKER CHEMICALS PLASTICS

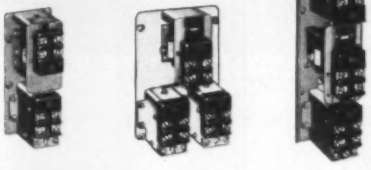


For Consistent Accuracy...



A-B BULLETIN 849
Pneumatic Timing Rela

A few of the varieties of A-B pneumatic timers



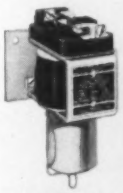
Single operation time delay relay | Dual operation time delay relay | Compound operation time delay relay

Specify ALLEN-BRADLEY TIME DELAY RELAYS

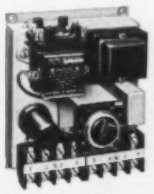
For maximum production, high-speed automatic processes demand that the required operations "start" and "stop" at the correct instant, time after time—*without variation*. For consistent accuracy and trouble free operation, no timing relay on the market can equal the performance of A-B Bulletin 849 pneumatic timers. The delay period can be varied from 1/20 of a second to 3 minutes, and the setting will hold with an accuracy of ± 10%. Conversion from ON-DELAY to OFF-DELAY (or vice versa) is simple—no adjustment is necessary. Like *all* A-B control, these quality timers have maintenance free, double break, silver contacts. The two sets of contacts—one N.O. and one N.C.—are electrically independent, for greater control flexibility. Also, auxiliary contacts can be easily added.

To make certain of a completely satisfactory electrical installation, specify Allen-Bradley "quality motor control"—in addition to the Bulletin 849 pneumatic timing relays. Write for details, today.

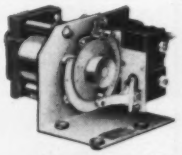
Allen-Bradley makes a broad line of timing relays to satisfy all automatic processes.



BULLETIN 848
Fluid Dashpot
Timing Relay



BULLETIN 852
Electronic
Timing Relay



BULLETIN 850
Motor Driven
Process Timer

ALLEN-BRADLEY

Member of NEMA

Quality Motor Control

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

FIVE-DEEP

Millions have been made and saved

with UCM's "FIVE-DEEP" Ferroalloys

Metal producers in their ceaseless drive to improve products and profits are learning the value of Union Carbide Metals' FIVE-DEEP ferroalloys. Here are some of the advantages these alloys provide.

Five Extra Values in Depth

1 Technology—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce more profitable metals. The payoff has been progress—over 100 new alloys and metals—providing countless ways to improve your products.

2 Customer Service brings you our integrated experience in the application of ferroalloys to various melting practices. Engineers from 9 UCM field offices travel a million miles a year to provide on-the-scene technical assistance.

3 Global Ore Sources assure you uninterrupted supplies of ferroalloys. UCM's close association with many mines throughout the world provides dependable raw material sources.

4 Unmatched Facilities free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

5 Strictest Quality Control—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

"INVENTORY LIQUIDATIONS ARE DIMINISHING and the extensive inventory readjustments caused by the 1959 steel strike are finally subsiding." This is the finding of Dr. J. M. Hoagland, economist for the National Assn. of Purchasing Agents. But no rebuilding is in sight. Steel buyers, for their part, point to the same conclusion. Only 7 pct expect larger inventories for the second quarter, a drop from 30 pct who predicted first quarter inventory accumulation.

OPEN COIL ANNEALING is getting an enthusiastic reception from steel companies in this country and abroad. Lee Wilson Engineering Co., Inc., reports 26 units have been ordered or installed recently. New annealing furnaces are going to Japan and Spain, as well as to major producers in this country.

NEW CAR INVENTORIES at the end of January were 1,027,000 compared to the record 1,062,000 set last July 31. At current selling rates the present inventory equals a 69-day supply of new cars. Compacts now run 33 pct of total car sales.

MORE ALUMINUM FASTENERS is sales outlook for 1961, according to Aluminum Co. of America. Big users of aluminum fasteners in 1960 were the architectural, transportation and consumer durable goods industries. Alcoa claims that advances in cold-heading techniques are helping the market expansion as production becomes faster and more economical.

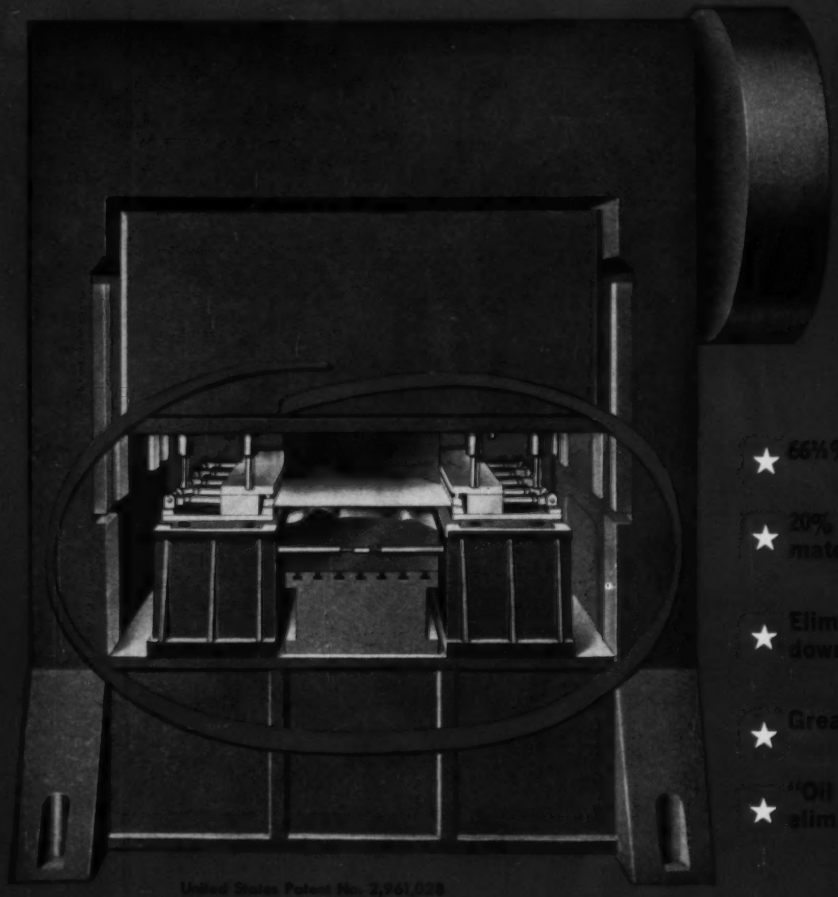
RETAIL SALES OF BUSINESS AND UTILITY AIRCRAFT in 1960 hit a record high of more than $200 million. Industry leaders look to an even greater acceptance of business and private plane use in the decade ahead. Sales in 1960 exceeded 1959 by $30 million. User emphasis has swung from the smaller trainer and sports types to the heavier single and twin-engined aircraft.

COMPETITION FOR STEEL ORDERS is so intense buyers can set time limits for mills to furnish quotations on delivery and price. Customers have been calling the turn on required delivery dates for a long time. Now they are contacting several mills, giving them the tonnage wanted and specifications. Each mill is told it has only so many hours to estimate its quote and call back.

APPLIANCE LEASING to apartment operators is announced by Admiral Corp. Included are ranges, refrigerators, and dishwashers.

IT'S NEW... IT'S REVOLUTIONARY...

Stretch Forming and Standard Draw Press Work COMBINED!!



United States Patent No. 2,961,028

- ★ 66⅔% saving in die cost
- ★ 20% saving in sheet material cost
- ★ Eliminates the hold down ring
- ★ Greater Part Accuracy
- ★ "Oil Canning" eliminated

THE CYRIL BATH COMPANY

33370 AURORA ROAD • SOLON, OHIO

(LOCATED IN THE GREATER CLEVELAND AREA)

Manufacturers of Radial Draw Formers • Dies • Tools
Press Brakes • Tangent Bending Sequence Presses • Press
Type Brakes • Special Machines

This new Cyril Bath, Tension Controlled Blank Holder, for shallow draw press operations stretches the metal sheet just prior to press forming. Pre-stretching makes the metal flowable or plastic like and parts are formed with extreme accuracy to the matching dies. Oil canning, wrinkles and trapped air pockets are eliminated. The hold down ring is completely eliminated so that die costs and scrap material is greatly reduced.

For Press users and potential Press buyers it is a must to investigate this new and outstanding development . . . Literature is available . . . write, wire or phone.

Military Procurement Practices: Target of Three-Pronged Attack

How the Armed Services spend $25 billion a year to buy things is under growing attack.

Leading the assault is Sen. Paul H. Douglas, who expects support from Congress, the White House, and the Defense Dept.

By R. W. Crosby

■ Critics of defense waste say 1961 will be different. They promise action on this generation-old issue this time.

The criticism which has been heaped on military buying practices is expected to reach its peak this year. In the wake of all the criticism will come a new assault from powerful Washington forces.

Leading the assault will be Sen. Paul H. Douglas, influential Illinois Democrat, who heads both the Joint Economic Committee of Congress and the Subcommittee on Defense Procurement.

Reform Movement—Sen. Douglas wants to begin a "radical reform" of the Defense Dept.'s procurement and supply system. "As a minimum," he says, "I believe that $2 to $3 billion per year could be saved by merely beginning reforms."

If aid for this reform comes from the key places he expects it, Sen. Douglas may well lead criticism of military buying out of a decade of nothing but sound and fury into a period of **action.**

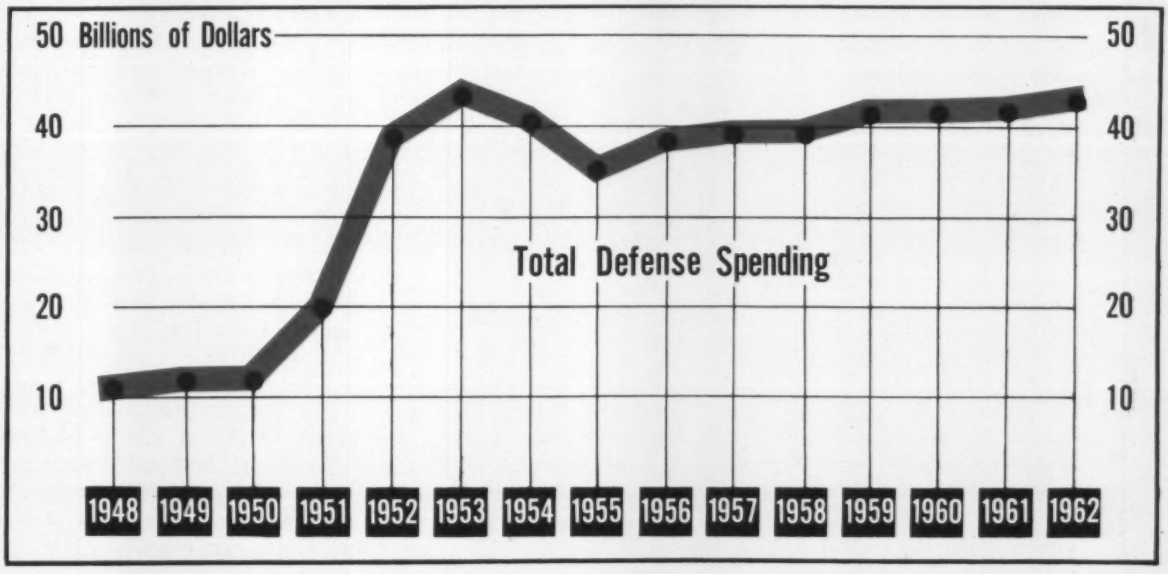
He expects aid from the White House, the Pentagon, and Congress.

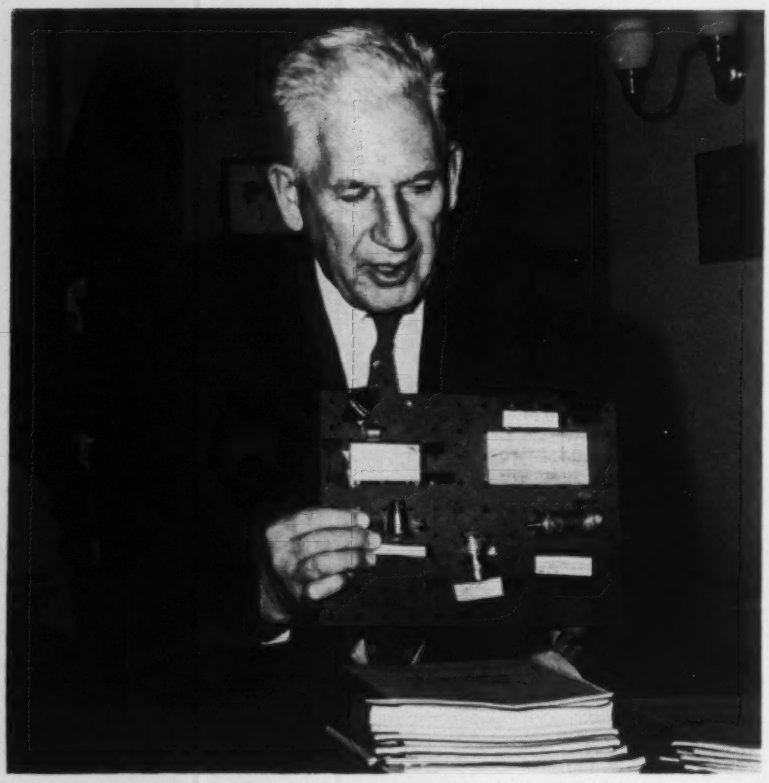
The White House—The backing expected from the White House is a Presidential directive to the Pentagon to put its procurement house in order. President John F. Kennedy favors elimination of wasteful defense practices and streamlining of the Defense Dept. How far he wants this to go in the area of procurement remains to be seen.

There are indications he will act in this area. The latest indication is his directive to Secretary of Defense Robert S. McNamara. He requests "prompt steps to improve the machinery by which Federal contracts can be channeled to firms located in labor surplus areas." It has long been a criticism of military buying practices that too much of the money was going into a relatively few areas.

New Approach?—Sen. Douglas expects Mr. McNamara to take a

Cold War Defense Costs Continue to Climb





WEEDING OUT WASTE: Says Illinois' Sen. Paul H. Douglas of his fight to end waste in military buying: "I am not trying to send anyone to jail. I am not trying to lay the blame on any corporation which has been obtaining inflated prices. That is not my purpose. I have been trying to remove needless waste, in the hope that we might save the taxpayers' money. And in the hope that money thus released can be used for a more effective national defense."

new approach to military procurement. Even before Mr. McNamara was in office, the Illinois Senator contacted him on the problems of military buying. He told him that waste in the Defense Dept.'s procurement and supply system was "appalling and even scandalous."

The Secretary of Defense, by now, is well filled in on the Defense Dept.'s feelings on military waste.

Big Business—Defense procurement officials maintain the public and the Congress don't understand "the methods by which the Defense Dept. always strives for efficiency and economy in the management of the taxpayer's dollar."

They point out that the $25 billion spent yearly in industry contracts is three times the combined purchasing volume of General Electric Co., General Motors Corp. and U. S. Steel Corp. "No company that big could be any more efficient than we are," procurement officials say.

Defense officials who agree waste is evident, scoff at reform measures. "We've had four major revisions in organization since World War II," one says. "Each was hailed as the answer to all problems and a guarantee to greater economy. And none of them has really done these things."

Congressional Support—Despite these arguments, backing in Congress for procurement reform is massive. Innumerable congressmen, Democrats and Republicans, have expressed concern over the matter of waste. This year they will submit legislation and set up hearings in efforts to resolve the procurement question. And if votes are needed, they probably will deliver them, too.

But votes aren't necessary to change military procurement practices. Sen. Douglas points out that the reforms he wants can be effected by Defense without legislation.

What to Do — (An interesting sidelight on this comes from the Senate Armed Services Committee. The committee, in direct contrast to the House Committee on Armed Services, declined to recommend legislation to reform defense procurement. At the same time, however, the Senate Committee recommended the Pentagon take administrative steps to improve buying procedures.)

What reforms does Senator Douglas want?

He told Defense Secretary McNamara: "There must be more competitive bidding, greater centralization of purchase and supply, much more efficient handling of the surplus supply and disposal system, and the reform of the stock fund and reimbursable requirements." Here are Senator Douglas' ideas on specific areas of waste:

Bidding — The Senator charges that the Defense Dept. has gone to extremes in negotiating contracts which could and should have been handled by bidding.

"Some 86 pct of all contracts," he says, "are now negotiated rather than let by competitive bidding. This is inexcusable and results in millions of dollars in excessive prices." He claims that on some negotiated contracts, profits run as high as 41 pct.

Prices — During the past two years the General Accounting Office, the Federal watchdog, has submitted 50 reports on details of waste in procurement and supply.

Sen. Douglas points out that these reports show that military purchasing officials accepted contractors' estimates of costs which contained obvious errors or were not based on actual cost experience. He has

countless examples of excessive prices. Among them are $3 wrenches for which the Army paid $29, and 25¢ lamp sockets purchased by the military for $21.

Government auditors are continually charging the Pentagon with waste on a larger scale. Charges go from spending a billion dollars for unusable tanks to hoodwinking Congress by building more than $50 million worth of construction without Congressional approval.

Duplication—Government auditors charge that in supply and procurement matters, each military department considers itself a separate and distinct entity. Little thought is given to coordinating with other services before purchasing or disposing of expensive items.

Sen. Douglas comments: "There is vast duplication of personnel, inventories, warehousing, etc., which can only be solved by centralizing the supply systems. This should be done immediately at least with respect to those items which are common to all of the services."

Stock Fund System—The Senator says the stock fund system has "resulted in the accumulation of excess stocks and cash. In addition, the reimbursable requirements have had the effect of preventing other services and agencies from using stock fund materials which have subsequently been disposed of as surplus."

Under the stock fund system, supplies which are surplus to one department are made available to some other department which may need them.

The Senator charges that in many cases the Defense Dept. has preferred to give away surpluses to states or sell them to private dealers for two cents on the dollar rather than let some other department have them.

Surplus Property—"The amount and disposal of surplus property is of scandalous proportions," the procurement committee chairman says. The government is now selling some $8 to $10 billion of surplus supplies.

Sen. Douglas asks: "What kind of a supply system do we have which could conceivably generate such amounts?" And when these supplies are disposed of, he says, the government gets only two or three pct of the original cost.

Single Procurement Agency—Sen. Douglas calls for a central agency where all procurement requests can go and be matched against existing supplies before new purchases are made.

The Defense Dept. already has an Armed Forces Supply Support Center. But, the Senator says, "it is not being properly used. Services have, in effect, a veto over its activities and its hands have been tied."

The Critics—Recently, there has been much backing for procurement reform. Besides the Government Accounting Office, such agencies as the Bureau of the Budget have joined in the criticism.

Sen. Stuart Symington's (D., Mo.) report to President Kennedy on Defense Reorganization came out strongly against duplication in military spending. It also called for centralized procurement.

Small Business—Depressed area reports and legislation express "deep concern" over procurement. Only about one pct of the all military prime contracts are assigned to economically distressed areas.

The Senate Committee on Small Business urges greater use of competitive bidding by the Pentagon. Sen. John Sparkman (D., Ala.), who heads the committee, has just introduced a bill to review the negotiated contract system of the military.

Hearings Due—Another strong backer of reform is Sen. William Proxmire (D., Wis.). He is pushing hard for a law guaranteeing small manufacturers a greater share of defense business.

All in all, hundreds of Senators and Representatives back some type of reform. Hearings will soon be underway to determine how far the Congress should go in seeking this reform.

The hearings should determine how critics of defense procurement waste can stop talking and start acting.

More Contracts Negotiated

Method of Military Procurement
Pct of Advertised Vs. Negotiated Contracts

	Total Net Value Billions	Pct Formally Advertised	Pct Negotiated
1951	$30.8	12.1	87.9
1952	41.5	10.8	89.2
1953	27.8	11.1	88.9
1954	11.4	15.6	84.5
1955	14.9	16.0	84.0
1956	17.8	15.9	84.1
1957	19.1	17.4	82.6
1958	21.8	14.3	85.7
1959	22.7	13.6	86.4

Appliances Try for a Recovery

Cost-Cutting Holds the Key—If Successful

After suffering a dropoff in sales last year, the appliance industry predicts a slight rise.

Cost-cutting, however, spells problems for industry vendors. By K. W. Bennett

▪ Appliance makers look for a 4 to 6 pct sales gain this year, but increased sales will still fail to make up for the 7 to 11 pct drop in 1960.

However, many in the appliance industry say 1961 has started well and they're "fairly" optimistic about its outcome. For example, a Whirlpool Corp. official says appliance sales are on the way up.

J. W. Craig, Westinghouse Electric Corp. vice president, claims January sales exceeded any month in the fourth quarter and were ahead of the same month last year.

General Electric Co. indicates 1960 sales levels could hold through this year, though industry reports suggest the company's January sales to dealers increased in some lines. Judson S. Sayre, board chairman of the Norge Div. of Borg-Warner Corp., and Maytag's Co.'s Claire Ely, vice president marketing, both speak of a 5 pct gain.

Low Stocks—On paper, at least, it's true that 1961 is starting well for appliance makers. One producer boosted refrigerator and range schedules 10 pct last month. Another dropped two planned production cutbacks when sales of at least one major item exceeded the January forecast. And refrigerator stocks in at least one plant are low enough to give production men some concern.

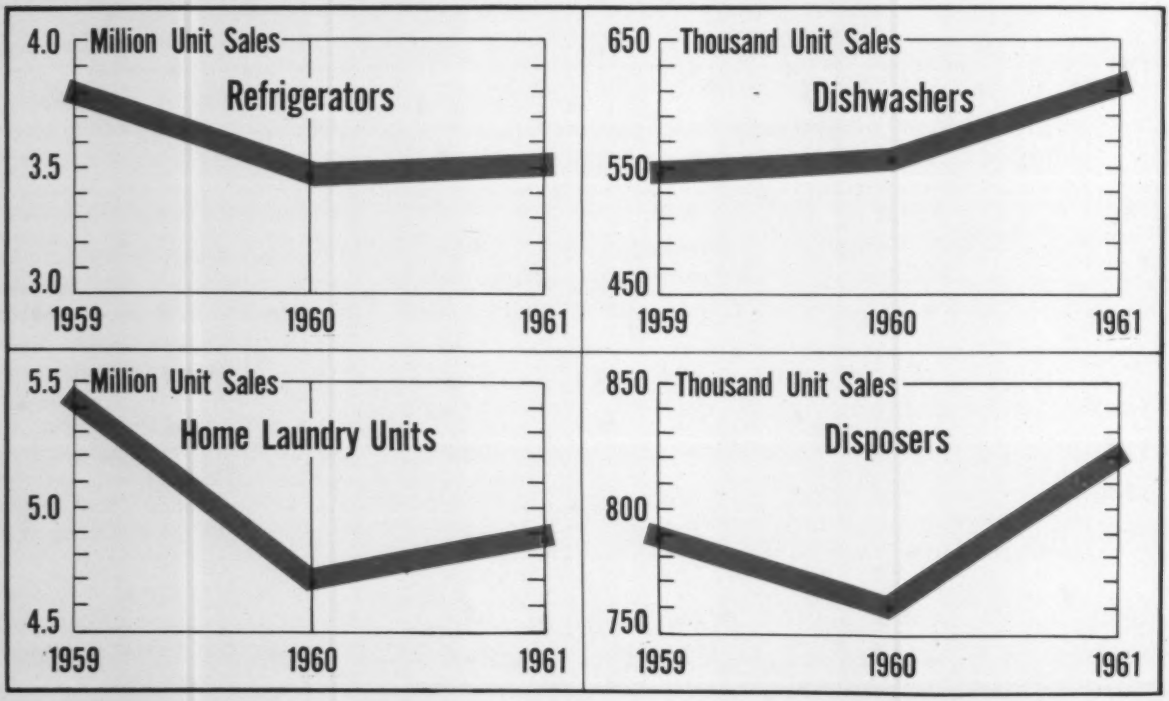
Hovering in the background, however, is the possibility of more price-cutting. One producer notes: "I still can't see prices holding at the retail level, unless things get a lot better."

How True? — The effect is already apparent. Dealers are encouraged to bear more of the promotion cost, and in-plant operations are being cut at any point where cost can be squeezed from the manufacturing cycle.

One plant, which maintained a "normal 60-day" inventory until 1959, has cut back to a 20-day steel supply. Barge steel shipments are rising as a freight cost-cutting measure. Vendors have been narrowed down to include only those in close proximity to the plant.

The Big Job—In one case, a top management specialist has been

Where Appliance Sales May Pick Up



given a newly created post of traffic controller. His job: To reduce inventory even further.

The reasoning behind these moves is simple. Management feels that profit losses at the point of sale must be offset with lower plant costs. Inventory is the major target.

Meanwhile, the results are becoming apparent. A materials man reports he has started surveying vendors regularly — steel mills in particular. He is now ordering two or three months before delivery date. This means that, despite procurement increases recently, the appliance industry is still at a lower inventory, relative to sales, than at any time since the latter days of the steel strike in 1959.

A Repeating Pattern — The appliance pattern generally means heavy production in the first half and stronger sales in the second. Freezers and refrigerators start selling well in June; laundry equipment in the fall. This pattern is expected to remain the same in 1961.

As the result of manufacturing on short lead time, however, the peaks will probably move further into the year. This would push up second quarter output. It would also move some plant vacation shutdowns from June to July, and boost second quarter procurement.

The second quarter usually means a slackening of buying. But several key manufacturers say they will probably buy in the second quarter at first quarter levels.

Buying More — They point out, though, that this doesn't necessarily forecast any great gain in purchases. But it does mean, for now at least, that some appliance makers will buy 10 to 15 pct more raw materials in the second quarter this year.

Home laundry equipment, representing about one-third of the appliance output, will hold back on manufacturing schedules until the third quarter.

The situation for industry suppliers shapes up as a tough battle on prices, some headaches with delivery dates, but a better year than last for sales volume.

Engineers' Salaries Keep Moving Up

Salary levels for engineers rose about 5 pct a year between 1958 and 1960, a survey shows.

Overall median annual salary for profession is now $9600.

■ Engineers' salaries are still going up.

Salary levels rose about 5 pct a year between 1958 and 1960, according to a survey conducted by the Engineering Manpower Commission of the Engineers Joint Council.

Large Sample—The survey, "Professional Income of Engineers—1960," covers approximately 200,000 engineering graduates in industry, education, and government. This represents about a quarter of the total engineering force in the U. S.

Among the findings:

The overall median annual salary of engineers is now $9600.

The 5 pct increase compares with an average annual increase of 6.5 pct between the years 1953-1958.

Seven years ago, in 1953, the first survey in the series found the median salary of engineers was $6500.

Young Profession — The report also shows engineers are a young group. The median age is about 32, based on a graduation average age of 22. Salaries tend to increase more during the early years of an engineer's career. They begin to slow down after about 20 years of experience. Recently this tendency has been less pronounced.

There is a marked difference between engineering salaries in industry, government, and education. (See table.)

Earnings Compared — The upward trend in engineers' earnings is shown by comparing the four surveys. The overall median (for all graduates) in 1953 was $6500; in 1956 it was $7750; in 1958, $8750; and $9600 in 1960. The last gain, from mid-1958 to mid-1960 was, as mentioned, about 5 pct a year.

How Salary Scales Compare

Here's what survey by Engineering Manpower Commission revealed about engineering salaries in fields of industry, education, and government, depending on years of experience involved:

Yrs. Experience	Annual Earnings (Medians)		
	Industry	Education	Government
1	$6775	$5375	$6275
5	$8200	$7350	$7175
10	$9975	$9100	$8750
15	$11,250	$10,950	$9075
28	$12,575	$12,575	$10,650

Making Plant Location Easier

Steelmakers Offer Customers Aid

Steel companies are offering customers a new service—valuable advice in choosing new plant sites.

Separate departments have been set up by two companies, and a third is exploring the idea. By P. J. Cathey

■ Plant location or re-location is a difficult matter.

Before a move is made, hundreds of questions must be asked and answered about raw materials, transportation, labor supply, land and construction costs, and taxes.

For manufacturers studying plant location, there's one valuable, and sometimes overlooked, source of help: their suppliers. Some steel companies even maintain full-scale plant location services.

Two such are U. S. Steel Corp. and Bethlehem Steel Co. A third—Kaiser Steel Corp.—is exploring the possibility of a formal program.

Goodwill Gesture—The aim, of course, is to help the customer find the best plant site possible. Steelmakers feel it will pay off in buyer goodwill.

James Mitchell, who spear-heads industrial development for Bethlehem, explains: "We're interested in giving all the service we can on any questions that need answering. Our office has regular contacts with about 1000 industrial developers, civic officials, railroads, and utilities.

LOOKING IT OVER: Bethlehem's James Mitchell points out benefits of a new plant site to a group of the company's customers. It's part of a new service by steelmakers that is cementing customer relations.

"In addition, we can call for advice from Bethlehem's traffic, purchasing, real estate, and other departments."

Similar Interests—Mr. Mitchell, who has been in industrial development at Bethlehem for 12 years, outlines some of the reasons why a steelmaker can best aid a steel user in locating a plant:

Both are in the metals industry with similar interests and problems.

The steel producer can explore a possible area for a new plant without revealing who's interested.

Specific, detailed information is available through the metalmaker's own departments without conducting outside surveys.

Full-Time Service—U. S. Steel is now setting up a plant location service for customers on a full formal basis.

It's under the general control of H. F. McCloy, director of real estate at USS. R. D. Hileman is in direct charge of the service. The Corporation feels it has the experience to give site seekers the real facts.

"This kind of service is needed," says Mr. McCloy, "because plant location has become such a complicated matter. There are so many groups ready to bombard the prospective builder with biased information."

Some Answers — Bethlehem's James Mitchell describes some customer questions:

How much will land cost? What are construction costs? How close will plant be to raw material supplies? To power supplies? How near are the markets?

What transport is available by rail, truck, or water? What are freight costs?

What's the area's labor pool? What are its skills?

Delrin Widens Its Market

Just one year ago a new plastic, Delrin, made its debut. Today it's used in 700 different applications (including parts shown here) in 27 countries and the U. S.

E. I. du Pont de Nemours & Co. invested $50 million over 12 years to research and develop the new material. It replaced metals in 82 pct of its first year sales.

Delrin's price has been cut three times since it was introduced at 95¢ lb. The price was recently dropped to 65¢ lb, effective March 7, and if markets continue to expand, the company plans further cuts. An indication that Delrin poses further competition for metals: Many of its major markets are metalworking's prime markets.

Plastics Reach for New Highs

Industry Executives Expect 5-10 Pct Sales Jump

Reinforced plastics suffered a 3 pct sales slump in 1960.

Officials expect the entire industry will push ahead 5-10 pct in 1961, with reinforced plastics joining the general boom.

▪ The $4 billion plastics industry will hit new highs in 1961.

Officials differ on degree, but all predict increased sales. Optimism is the general attitude, even for reinforced plastics which slumped 3 pct in 1960 sales.

The Society of the Plastics Industry estimates total sales jumped 5 pct in 1960. It forecasts another 5-10 pct jump this year.

Double the Output—As for reinforced plastics, about 250 million lb of polyester resin, and its strengthening glass fibers, were used in 1960. Clare Bacon of Owens-Corning Fiberglas Corp. sees reinforced output doubling in the next five years to 500 million lb annually.

Samuel Moore, Interchemical Corp., offers a similar estimate—sales of 255 million lb in 1960. He expects 1961 sales to hit a new record of 271 million lb.

Boats Boom Again—Small boats are still boosting the fiberglass reinforced plastics market. Americans bought 56 million lb of reinforced plastic boats in 1960. This market should shoot to 58.75 million lb in 1961.

Four major markets absorbed 68 pct of fiberglass reinforced output in 1960, Mr. Moore reports. They include boating, transportation equipment, construction, and aircraft and missiles.

James Sayre, of Allied Chemical Corp., figures the use of fiber reinforcement material alone topped 70 million lb in 1960.

300,000 Units — "The fiberglass boat market that saw 125,000 boats sold in 1960 will move to 300,000 units per year by 1965," Mr. Sayre predicts.

Growth in the car market is also expected. He points out 1961 cars use 300 different plastic parts. Research and development will lead to more extensive plastic uses in this area.

Truck Market — "Truck body manufacturers are another major market target," Mr. Sayre says. He sees a potential of 100 million lb of reinforced plastic per year here, or 40 pct of the total 1960 reinforced output. Only a small fraction of this amount is currently produced.

Plastic sheet for building purposes, a $42 million market in 1960, will leap to $80 million per year by 1965, Mr. Sayre forecasts. That's 90 million lb of reinforced plastic sheet. He estimates 85 million sq ft of plastic building sheet were produced in 1960, so in five years this would jump to 170 million sq ft.

Shoot for Missiles — The missile field is also due for special plastics sales attention.

Reinforced plastics that will retain strength at 5-15,000°F are on the way. Fuel tanks for the Polaris missile are already made of reinforced plastic, with metal liners.

Makers are aiming for a plastic ICBM. The material now is used for major structural components in both military and civilian jet planes. It also forms the body of at least one ultra-sonic missile.

What's Ahead in Depreciation?

Government Plans Stronger Tax Enforcement

It's time to take a closer look at future depreciation allowances.

No new tax doctrines are pending, but the present one will probably become more strictly enforced.

By G. J. McManus

■ Is it time for depreciation planners to take a hard look into the future?

Recent developments indicate this kind of view may be needed to avoid tax problems and to provide modernization dollars as fast as needed.

In part this is a matter of government pressure. Treasury Dept. is pushing for depreciation schedules based on a more precise estimate of useful life.

Actually, the government is saying companies have been depreciating too large a portion of investment. Salvage value should be estimated in advance, says internal revenue; it should be excluded from the amount written off. This is not a new doctrine but it is getting new enforcement.

Advance Thinking—In situations where salvage value is high, advance thinking could have the effect of reducing depreciation. However, the overall effect would probably be just the reverse.

As an example, A. M. Byers Co., Pittsburgh, recently devalued its assets by $5.6 million. Suppliers of wrought iron and steel pipe, Byers is taking part of the write-off by shortening the future life of equipment and adjusting current values accordingly.

Market and technical changes figure in the acceleration of depreciation. One effect of the move is to swing the past fiscal year from the profit to the loss column. But in terms of cash generated, Byers gets a big lift.

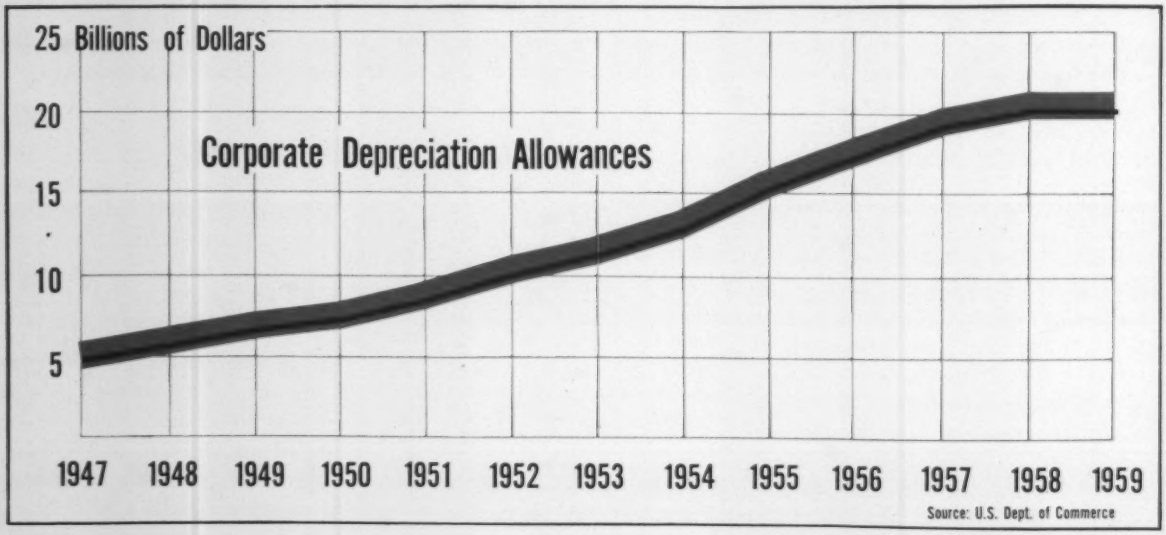
Go Back—By carrying part of the loss back to three profitable years, the company estimates it will claim $1.7 million in tax refunds. Another part of the slash will be available for carryback in subsequent tax periods. Byers estimates this will reduce taxes by $1.2 million.

In other words, the company is taking a bookkeeping loss of $5 million but is adding $3 million to its cash flow.

This kind of tax treatment is not unique. Accountants say it is done on a smaller scale by other companies. But the more conventional course is to wait until actual disposition of equipment before making the value adjustment for tax purposes.

Pays to Wait—There are good reasons for delaying unless you have an ironclad case. If a company's estimate of remaining life proves too short, it must pay back taxes. This happened to steel mills when they guessed wrong on the speed with which electrolytic tinning would replace hot dipping.

After a Decade, Depreciation Levels Off



Moreover, any departure from established depreciation schedules invites special attention from tax collectors. According to tax lawyers, the investigation takes in not just the accelerated depreciation but overall depreciation. If any part of the investment is being written off with undue speed, this can be used to block proposed changes.

"It gets down to a question of horsetrading," says one lawyer.

The theory of depreciation change is clearly recognized by the Treasury Dept.

Useful Modification—"The estimated useful life may be modified by reason of conditions you know exist at the end of any tax year," says a tax guide. The department adds that this can be done "only when the change in useful life is significant and you have a clear and convincing basis for such a redetermination."

You can make a clear-cut case for value loss by disposing of a machine. However, there is a danger in waiting until the extent of depreciation is shown by this means.

"It does no good for a company to get a tax refund after it's gone bankrupt," says a steel accountant.

This danger seems particularly real now with rising foreign competition and rapid technical progress. For example, a backer of basic oxygen steelmaking predicts one-half to one-third of the openhearths now operating will have to be retired in 10 years. Assuming this is true (many say, no) a 20-year depreciation schedule for openhearth investments in the retirement class is not recovering dollars fast enough to make the conversion.

The matter of timing is stressed by Fred C. Foy, chairman of the board and president, Koppers Co., Inc., Pittsburgh. As it stands, says Mr. Foy, technical progress frequently outdates a machine before it has been written off. To make a replacement at this point, a company may have to take a heavy loss in one year.

RED HOT: Experimental magnetic coils, contained in a metal tube, are heated red hot by a radio-frequency coil contained in an evacuated bell-jar. Process is part of a search for very strong magnets.

Bell Labs Boost Magnet Potential

▪ Important applications in the field of communications are being envisioned by scientists at Bell Telephone Laboratories. They recently proved it's possible for superconducting solenoid magnets to produce extremely high magnetic fields.

This is a feat that had been considered possible for many years. However, materials used in the past would only sustain fields of a few thousand gauss. Also, in past experiments, larger magnetic fields caused superconducting properties to disappear.

What Bell scientists have now come up with is a compound of niobium and tin, fabricated and reacted by special metallurgical methods. It's technically called Nb_3Sn.

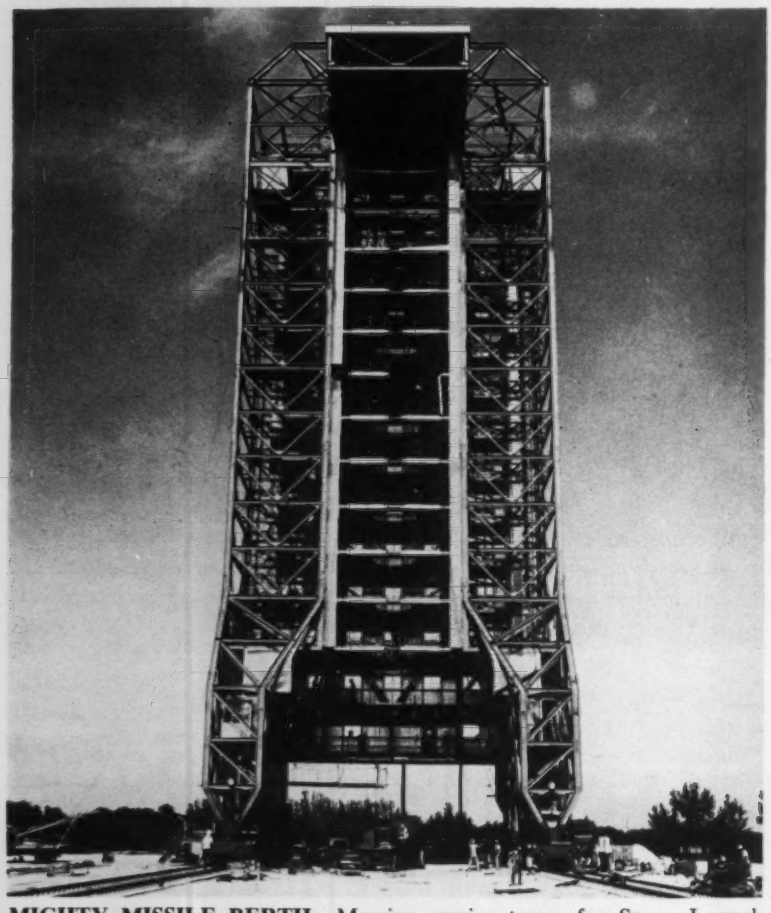
Steady-State — The new compound, Bell says, makes steady-state magnetic fields of 88,000 gauss possible.

Actually, the compound was first discovered at Bell labs in 1954. Until just recently, however, its critical field was never measured. Bell notes the material is extremely brittle and has posed problems in its use in coil magnets.

Another interesting feature of the discovery: A superconducting solenoid does not require use of electric energy once the field is established. The solenoid of ordinary metal, on the other hand, will use large amounts of energy. Also, Nb_3Sn becomes superconducting at 18° Kelvin.

Applications—Scientists see several application possibilities: Large magnetic fields could extend the operation of such devices as traveling wave tubes and masers.

Space Launcher Towers At Cape Canaveral



MIGHTY MISSILE BERTH—Massive service tower for Space Launch Complex 36 is nearly complete at the Atlantic Missile Range, Cape Canaveral, Fla. Standing 173 ft high, it rolls along heavy, double rails to straddle launch pad (behind camera). It will help launch the new Atlas-Centaur space vehicle this year, built by General Dynamics Corp.

January Unemployment Worst Since 1940's

Unemployment rose sharply last month, reaching a total of 5.4 million at mid-month, according to the Dept. of Labor. This was an increase of about 850,000 jobless from mid-December.

While the jobless rate fell slightly to 6.6 pct of the labor force, compared with 6.8 pct the previous month, the situation was called "equal to the worst for the month since the early 1940's."

At the same time, the department added 25 major industrial centers to the list of areas with "substantial unemployment"—more than 6 pct of the available work force unemployed.

This raised the total of such areas to 76, highest total since the 1958 recession when 89 of the 150 major areas were in this classification. Added to the list were some of the nation's largest cities: Philadelphia, Cleveland, Baltimore, Los Angeles-Long Beach, St. Louis, and Kansas City.

February could show a more-than-seasonal increase in unemployment. Figures are usually gathered in the second week of each month. It will coincide with substantial automotive layoffs this month.

Also, the Labor Dept. notes, the number of workers who have been out of work for 15 or more weeks rose by 300,000 last month, to a total of 1.3 million. And 50 pct of this total has been out of work for six months or longer.

Despite a drop of 1.6 million from December, mid-January employment of 64.5 million set a new record for the period.

U. S. Steel Revamps Wire Marketing

A unified marketing-research program is operating at U. S. Steel's American Steel & Wire Div., Cleveland.

Research and marketing efforts have been combined. At least 50 pct of research budgets will help develop new applications.

Product objectives include 600,000 psi tensile wire, missile pressure bottles reinforced with high tensile wire, shock mounts for Mercury space capsule radar transmitters, and a fine-woven wire parachute for Project Dynasoar to withstand re-entry heat.

Machine May Slash Inspection Costs

Magnaflux Corp., Chicago, is building a $160,000 continuous billet inspection machine. It could cut inspection costs on carbon steel billets from $8 per ton, when the billet is pickled, to $1 per ton.

The Magnaglo dye inspection unit will handle 4-in. steel billets of 40-ft length, weighing a half-ton each. It will process a billet every 12 seconds, with four inspectors operating it. American Steel & Wire Div., U. S. Steel Corp., is buying the first unit.

In production is a second, larger machine to handle 10-in., 20-ft blooms at the rate of one a minute. A larger machine is planned that will process 1-ft blooms of the same length.

Besides cutting pickling costs, the continuous unit can eliminate overall scarfing of a billet or bloom.

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INDUSTRIAL BRIEFS

Hawk to NATO—Aerojet-General Corp. has signed a licensing and technical assistance agreement with Societe Europeene De Teleguidage (SETEL), Paris, to produce Hawk motors. A U. S. Army surface-to-air weapon, the Hawk will bolster aerial defenses of NATO.

Alcoa Presents—Aluminum Co. of America has organized a new subsidiary to market residential aluminum building products. Alcoa Building Products, Inc., Pittsburgh, will distribute and sell Alcoa siding, gutters and downspouts and soffit.

AZI on the Move — American Zinc Institute has moved its Detroit headquarters to expanded facilities at 638 New Center Building, Detroit. James E. Zane, market development engineer, is in charge.

Specialty Buy — Anco Specialty Co., Amherst, O., has acquired manufacturing rights, patents and accounts of the vegetable machinery division of The American Specialty Co., Amherst. Anco will expand its metal fabricating line to include hoppers, bins, chutes, work tables, conveying equipment and exhaust and ventilating systems.

Steel Warehouse Slate—National officers of the Association of Steel Distributors, Inc., were re-elected to second terms at the Miami convention. Walter Ising, Laube Steel Co., Chicago, is president. Vice-presidents include Saul Bradburd, Interstate Iron & Supply Co., Philadelphia, and Leo Goldner, Parker Steel Co., Toledo. Secretary is Jack Jacobs, Jacobs Bethridge Steel Co., Toronto. P. D. Wingate, Hamilton Steel & Aluminum Corp., New Haven, Conn., is treasurer.

Hoist Heads—Fred E. Rau, Yale & Towne Mfg. Co., Philadelphia, was elected president of the Hoist Manufacturers Assn., Inc. Vice-president is Edward S. Boyer, American Engineering Co., Baltimore. Directors include Raymond A. Davies, Chester Hoist Div., The National Screw & Mfg. Co., Lisbon, O.; Edward J. Byrne, Chisholm-Moore Hoist Div., Columbus McKinnon Corp., Tonawanda, N. Y.; and Thomas W. Kruger, Coffing Hoist Div., Duff-Norton Co.

AISI Changes—C. M. White, retired former chairman of Republic Steel Corp., is now honorary vice-president of the American Iron & Steel Institute. T. F. Patton, president and chief executive officer of Republic, succeeds Mr. White on the AISI executive committee.

Canadian Trek—Scientists from 40 countries attending the 18th International Congress of Pure and Applied Chemistry in Montreal will tour Canada after the August 6-12 sessions. Visits to atomic energy plants and icefields in western Canada are included among eight post-Congress tours.

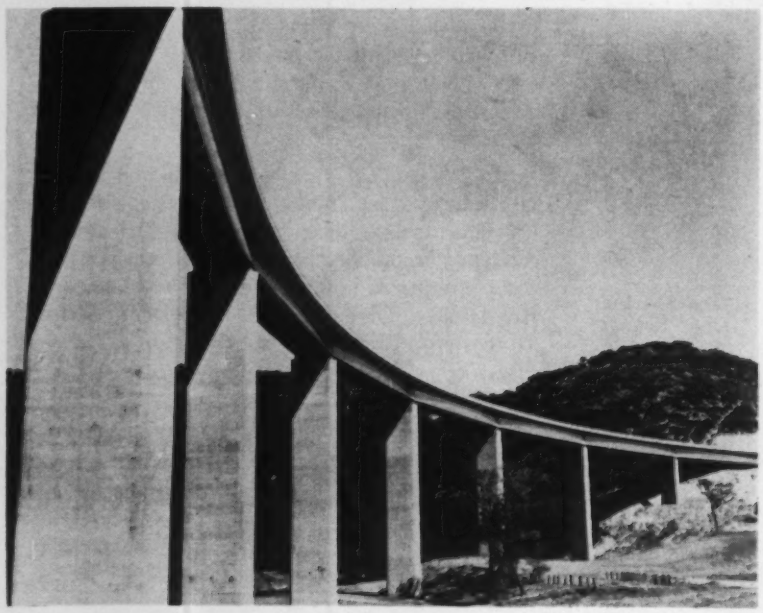
Summer Course — Boston College will again conduct a special two-week intensive course in Modern Industrial Spectrography, July 17-28. The course is designed for chemists and physicists to learn techniques of emission spectroscopy for use in analytical work.

Texas Opening — Stainless Processing Div. of Wall Colmonoy Corp. has opened a new furnace processing plant in San Antonio, Texas. Wall Colmonoy also has plant and office facilities at Houston.

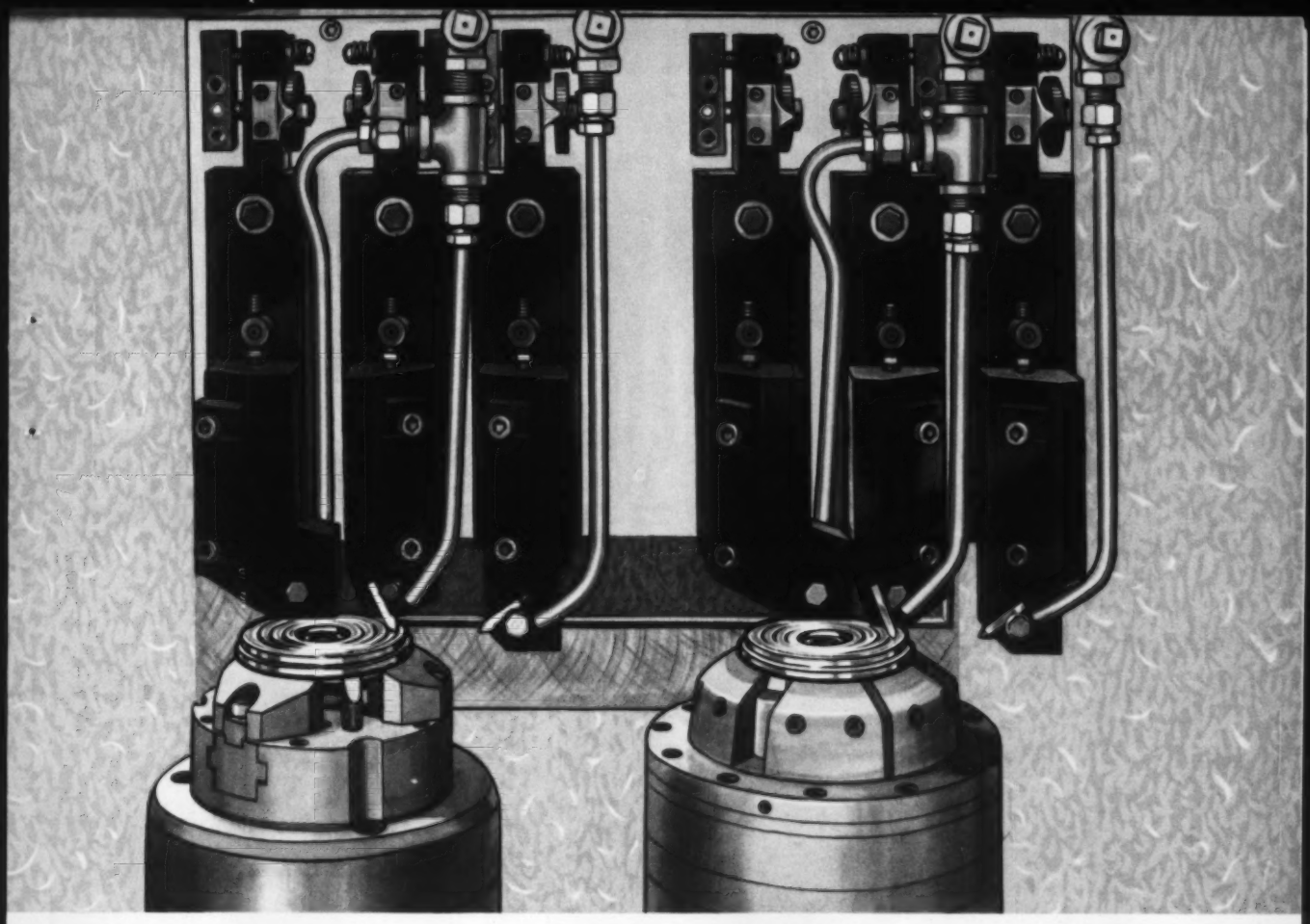
Koppers Expands—A $300,000 expansion program has been started by the Metal Products Div., Koppers Co., Inc., Baltimore. The division has plants at Glenarm, Md., and Bordentown, N. J.

Missile Order — Yuba Consolidated Industries, Inc., has been awarded a multi-million dollar contract at the Little Rock Air Force Base Titan II Missile Installation near Conway, Ark. Second such contract in a month, it pushes Yuba's backlog to $81 million. Southwest Welding & Mfg. Div. of Yuba, Alhambra, Calif., will manage both contracts.

Bridge Carries Award For Beauty



BEST IN THE WEST: Vinnell Steel, Irwindale, Calif., holds a 1960 American Institute of Steel Construction Architectural Excellence award for fabricating and erecting the most beautiful steel bridge in the U. S., in fixed spans under 400 ft costing over $500,000. The prize-winning bridge is on Route 166 crossing the Huasna River near Santa Maria, Calif.



New Britain's new concept for contour turning and boring

Beyond a certain point, continued refinement of existing designs in machine tools ceases to make an appreciable contribution to performance. Thus in designing our New Series of Vertical Precision Boring Machines, we have incorporated several completely new design concepts to provide improved performance and greatly increase over-all usefulness.

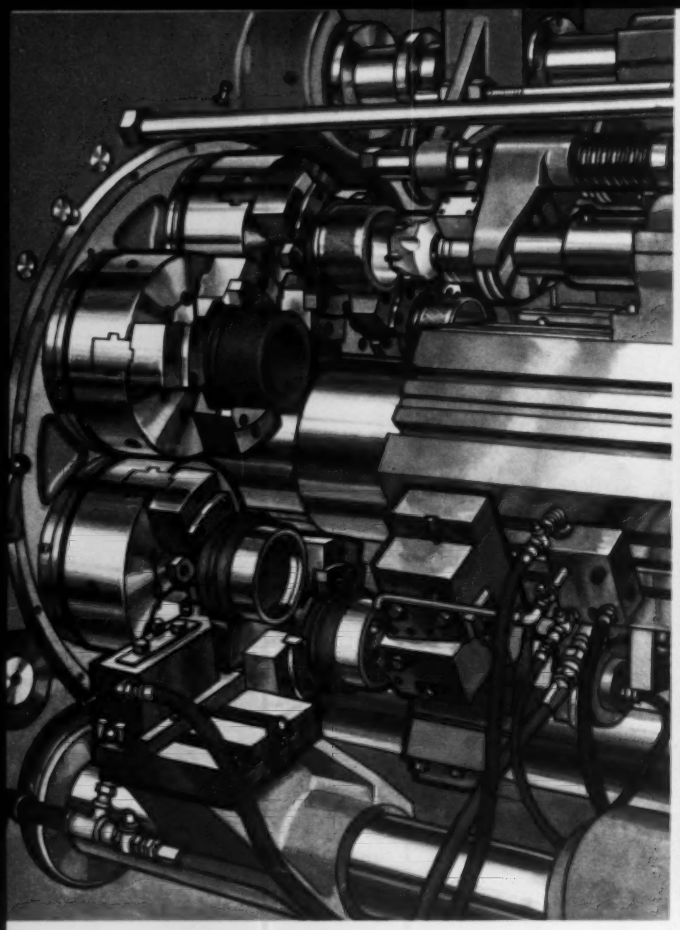
For the first time machines of this type can be used as building block units. Their clean-sided design permits any number of self-contained machines, each with one or more spindles, to be arranged side by side and operated as a single unit. They also may be operated with equal efficiency as individual machines. Parts can be inverted on adjacent machines or on adjacent spindles of the same machine.

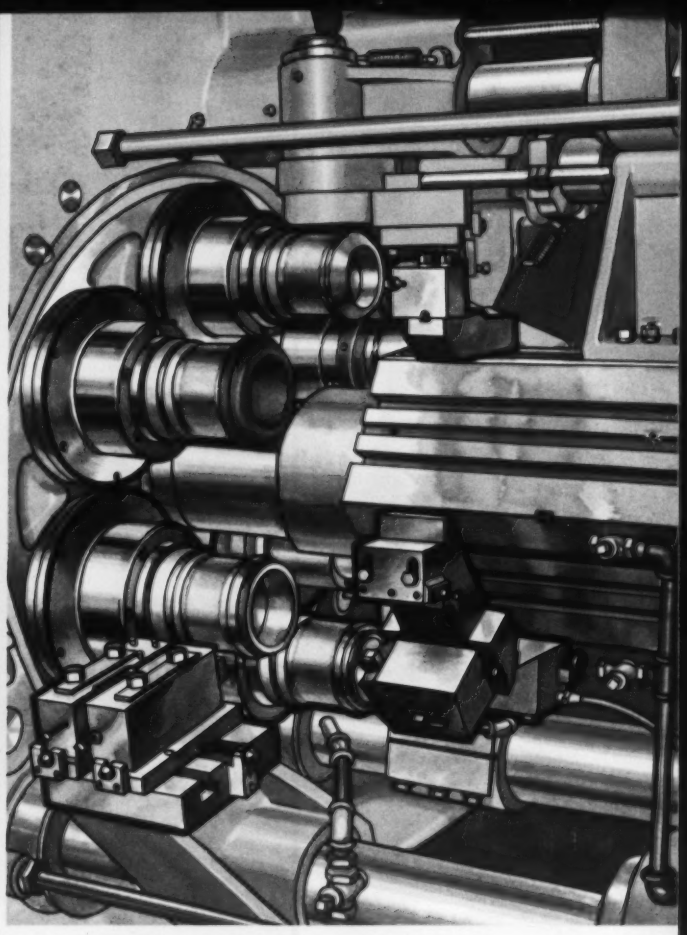
In order to take the fullest advantage of the precision inherent in cam control, long linkages between cams and slides have been eliminated. A pair of cams is mounted on a common shaft which is carried *within the vertical slide*. Since all slide actuating forces are contained in the vertical slide, both cams are directly adjacent to the slides they control and no outside forces are imposed on the slide ways. The result is maximum rigidity for heavy cuts coupled with extreme accuracy for close tolerance work.

This unique and eminently workable approach to contour turning and boring results in the highest order of accuracy on even the most complex pieces. Your New Britain Representative can give you details on the nine different models available in this series. For catalog material, write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division - New Britain, Connecticut





New Britain . . .
still the best Chucker you can buy

We're not unhappy about the fact that for years, in many plants, the name New Britain has been synonymous with chuckers. New Britain Chuckers have turned out literally millions of pieces of work for practically every major industry in the world. This is less important to the prospective buyer of one of these machines, however, than the capabilities of these machines today. How do they stack up against other chuckers or even other types of machines capable of doing similar work? Pretty well, we think.

New Britain's open-end design still can't be beat for unlimited accessibility to the tooling area. This same wide-open feature makes it doubly more practical to adapt these machines to automatic loading and unloading.

The unusual combination of longitudinal and transverse forming motions is another unbeatable New Britain feature. The massive forming arms on New Britain Chuckers allow heavier cuts and cuts of much greater complexity. This ability to do more work can eliminate the need for second operation machines in many instances. For really complex work, two chuckers set up side by side, as shown here, each doing one side of the piece, can smooth the way for high production. Less complicated work can be set up to perform both sides of the same piece on a single machine.

These massive machines provide the tooling combinations, spindle speeds and power to perform the widest possible variety of work. Their basic design will stay new for years to come, continuing to provide profitable operation. You may know New Britain Chuckers, but you may not be fully aware of the improved series presently being offered. Why not call your New Britain Representative or contact us at The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division - New Britain, Connecticut

Avoid the Short-Term Freeze

Despite the need to concentrate on short-term problems, managers can't short circuit the future.

Among the lasting issues to be met: Changing markets and labor needs, automation, more emphasis on research and development.

■ Long-range business planning is difficult these days. As a manager, you probably find it hard to get away from short-term thinking.

Problems connected with poor sales, rising costs, and idle capacity must get top priority. But in battling the present, don't short circuit the future. Try to keep long-term plans and programs active—and moving ahead.

Be Realistic—The company which doesn't is only courting more, and greater, problems. To put the freeze on long-range thinking because business is slow is unrealistic.

Looking beyond the present, these are some of the issues business must face: More aggressive marketing. New product planning. Changes in the labor force. Growing automation. Greater emphasis on research and development.

Changing Economy—An entirely new and different economy is developing, according to Forrest H. Kirkpatrick, assistant to the president, Wheeling Steel Corp. He lists these basic changes:

Industry will put a larger share of its capital investment in research and development.

There will be a 55 pct increase in the 18 to 24-year-old section of the population, changing both the labor and market profile.

More attention will be given the "social climate" of the work situation and human relations factors related to productivity.

Government will play an increasingly important role in every phase of business and industry.

Labor Changes — Another forecaster, Clark Caskey, program director of the Univ. of Michigan Bureau of Industrial Relations, concentrates on the changing labor picture.

New systems and procedures will have a major impact on clerical and sales people, he notes. As office mechanization grows, clerical workers will need a higher level of education.

Unless wage gaps between the skilled and unskilled widen in favor of the skilled, there will be little incentive for the less ambitious to take training, he predicts.

"Training is time consuming and very expensive," says Mr. Caskey. "These factors will limit the recruitment of many companies to the battle of the want ads and the service of employment agencies. We may see pirating at a level beyond anything in the past.

"Unless industry enters into training programs on a rather large scale, it will be faced with . . . government intervention or frustration in meeting modern manpower needs."

Are Employees Discontented?

■ Do an employee's personal problems affect his job attitudes? Not as much as might be expected, according to a study by Opinion Research Corp., Princeton, N. J. Among almost 2000 employees studied, job attitudes among persons with many personal problems differed little from attitudes of those with few problems.

Job Inspired — "Factors shaping job attitudes seem to be experiences encountered on the job, which management can do something about," says the ORC.

To gage the extent of personal problems, employees were grouped according to answers on questions about marriage, children, money, health, and troublesome personal habits.

How They Compare—However, when asked about job attitudes, these results showed up:

How they rate their company as a place to work: Seventy pct of the "many problems" group and 65 pct of the "few problems" group agreed it was "above average" or "one of the best."

On rating the fairness of supervisors: A "very good" rating came from 29 pct of the group with many problems and 30 pct of the group with few problems.

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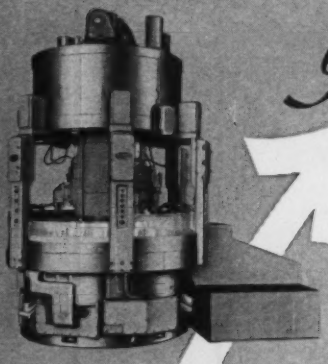
You can't beat a

BULLARD



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10" with 6, 8, 12, or 16 spindles, 14" and 18" with 6 or 8 spindles.

Day in and day out — in metalworking plants around the world — modern machine tools designed and built by The Bullard Company are proving their ability to produce more in less time — thus, reducing the cost per piece.
It will pay you to investigate and compare the many advantages offered by modern Bullard machine tools.

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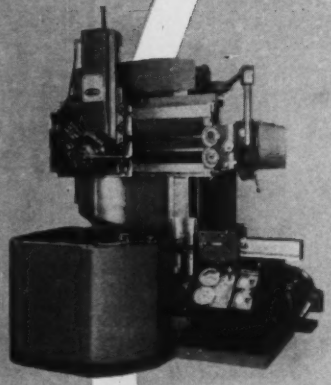

Dynatrol V.T.L. and Vertical Boring & Turning Mill
26" to 86" in 10" increments and 108", 124", and 144" table sizes.

Man-Au-Trol V.T.L. and Vertical Boring & Turning Mill
For fully automatic operation, can be applied to any or all heads of Dynatrol at time of ordering or at a later date.

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Automatic and tracer models each in four sizes.

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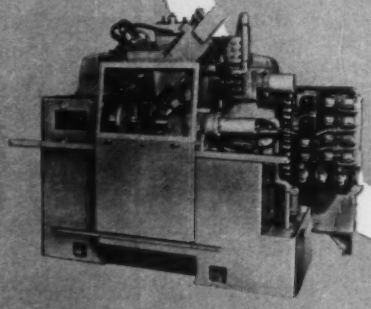
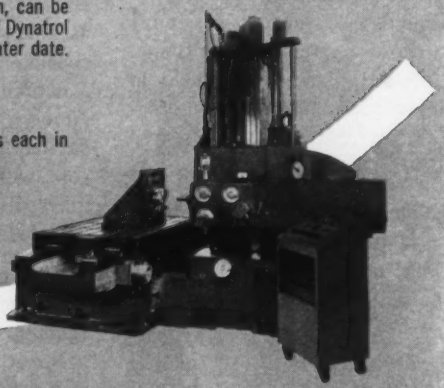
In 3", 4" and 5" spindle size. Many combinations of bed length, table size and vertical travel.





Ford Develops a 'Little' V-8

A new V-8 engine, designed for Ford's new 115 in. wheelbase cars, is nearing production.

Engineers expect the engine to make its appearance by next fall. Other Ford car and truck models may make use of it.
By A. E. Fleming

■ At Ford Motor Co.'s Cleveland Engine Plant No. 1, work is progressing slowly on the engine for next fall's new-size cars.

The work: A V-8 engine designed specifically for the 115 in. wheelbase cars that will fit between Falcon and Ford, and Comet and Mercury. There is also the possibility that the engine may be offered in the Falcon, regular Ford line and some truck models.

However, there is little hope of getting any semblance of production underway before August or September. This indicates an October or November introduction for the new line.

The Latest Plans—Two or three engines will be turned out in April and another nine in June, according to the latest plans. So far, technicians have but one model of the new engine—and it was hand-built.

The IRON AGE has learned that the "little" V-8 will have a displacement of 260 cu in. This compares with 292 cu in. for the 175 hp model that currently is Ford's smallest V-8. This would also top the 215 cu in. displacement of the 155 hp V-8 used in the Buick Special and the Oldsmobile F-85.

Ford engineers are said to have originally planned a 220 cu in. size, but apparently decided to come up with a peppier engine.

Undetermined Horsepower—Since the project is still in the testing stage, horsepower hasn't been set yet. But the rating may well be around 200 hp, compared to 85 hp in the Falcon six-cylinder engine and 135 hp in the Ford six.

Although Ford researchers checked aluminum as a possibility for cylinder block material, the new V-8 almost certainly will be cast iron. Ford officials have repeatedly said they can build an extremely light cast iron engine.

The production required by the new engine will also mean tooling changes at plant No. 1. In fact, some machinery already has been sent to Cleveland Engine Plant No. 2 where the six-cylinder and some V-8 engines are produced.

Taking up a great deal of space at Plant No. 1 are Edsel V-8 engine tools. This machinery has been virtually untouched since Edsel production was discontinued in November, 1959. Now there are few guesses as to what will happen to this machinery.

Reports are that the Cleveland Plant No. 1 will be highly automated. One estimate says no more than half of the workers now needed will be used to produce the V-8.

Despite the new engine, Ford is expected to retain all its present engines this fall.

More Changes at Chrysler

■ Chrysler Corp. paused long enough in the midst of its legal suits and proxy fights last week to make three announcements: Imperial assembly is moving from its present quarters in Dearborn to Detroit's Jefferson Ave. plant; Conant Stamping Plant operations will move from Detroit; and a new Chrysler-Plymouth sales organization has been formed.

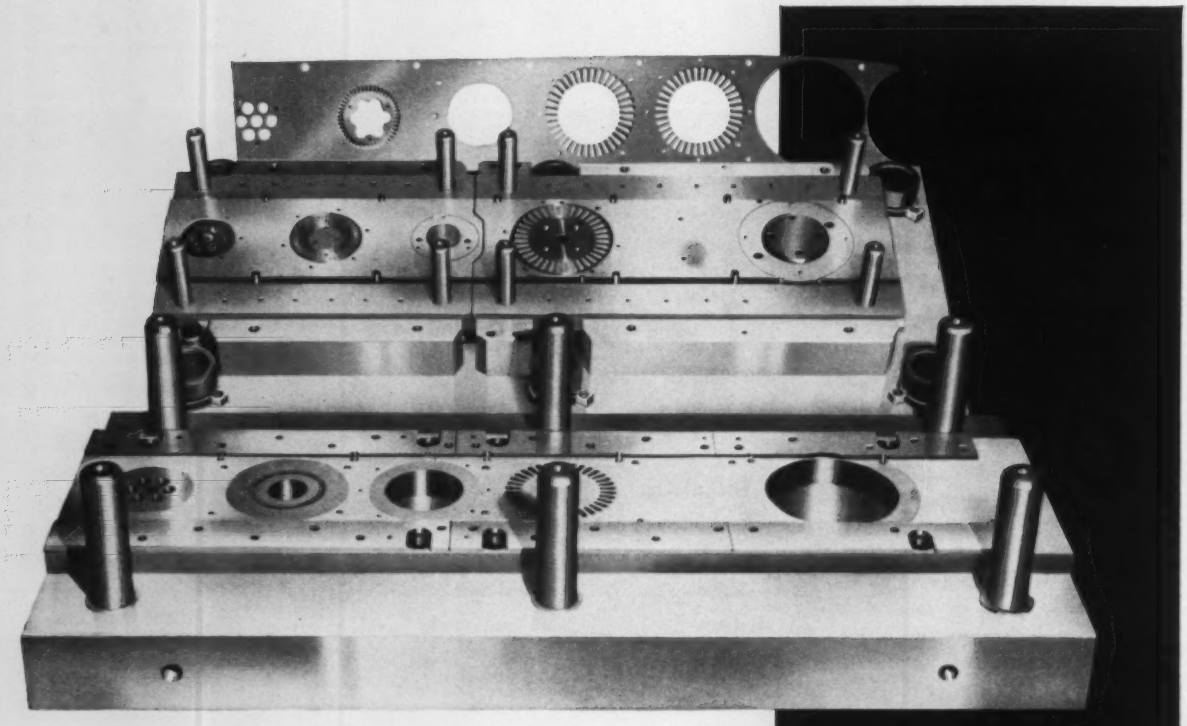
Imperial will make the move by May 1. This could possibly end 1961 output of the luxury car. Further, it could well mark the end of Imperial as a separate and distinct make.

It could, for example, again become part of the Chrysler line and named the Chrysler Imperial. As such, Imperial would use the same unitized body as Chrysler and the company would no longer have a car with a separate body and frame.

Plant for Sale?—Chrysler has not made its intent clear regarding the outcome of the Dearborn plant. In 1958 it was converted to Imperial assembly at considerable cost. An attempt to sell the plant would not be out of the question.

As for the Conant situation, much of the stamping work will now be distributed to other Chrysler facilities around Detroit. The rest will go to Twinsburg, O. Underbody assembly will stay at Conant, requiring about 300 of its present 1400 hourly employees.

Basic Responsibility — Forming of the new sales organization was perhaps tipped off when De Soto left the scene last fall. E. C. Quinn, Chrysler vice-president-sales, says: "Future business contacts with Chrysler-Plymouth dual dealerships now become the basic responsibility of one sales force and its representatives. This will simplify the dealer-company contact work and give dealerships more time for retail sales development."



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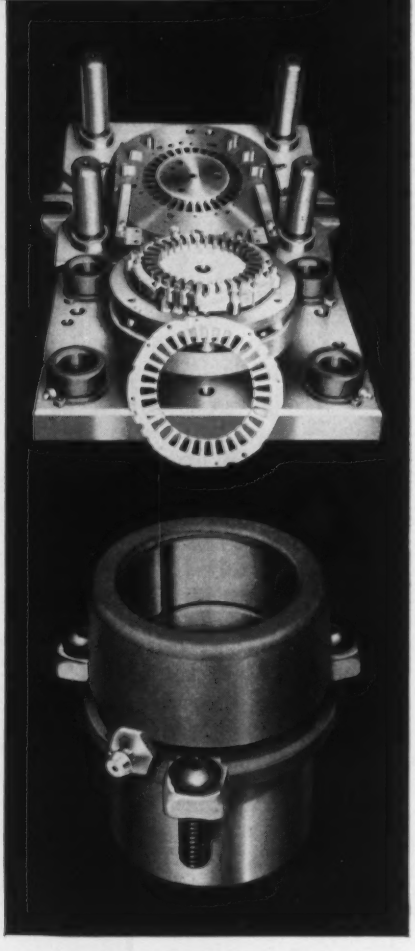
Carbide dies designed and built by Lamina assure full realization of your production requirements. Lamina-bronze guide pin bushings are wring-fit in the die shoe to provide distortion-free, full-bearing surfaces that result in better die alignment, less maintenance and longer die life. For more accurate press operation, higher production and lower costs—standardize on Lamina dies and details.



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WE WOULD BE PLEASED TO QUOTE
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West Building Boom Continues

Farwest Companies Plan New and Bigger Plants

New 1961 building programs have been scheduled by scores of California companies.

Millions of dollars will cover expansion projects and new plant construction as the Farwest continues a growing era. By R. R. Kay

■ It will be another year of expansion in California.

Millions of dollars will pour into new or larger plants. The types of products reflect an economy that's not just growing, but growing up.

Here are some of the companies putting their money into expansion:

Space Technology Laboratories, Inc., $25 million for a 10-building space research and engineering center at Redondo Beach;

Metal Cutters—Pacific Abrasive Supply Co., City of Commerce, abrasive and metal cutting tools;

Acratool, Inc., Ontario, small arbor press;

Aerojet-General Corp., Chino, a machine shop and development manufacturing building added to its space-age research laboratory;

Raytee Co., Los Angeles, bearings, valves, cylinders;

Collins Machinery Corp., Monterey Park, pipe and bolt threading machine, abrasive cut-off equipment;

Auto Control Laboratories, Inc., Los Angeles, environmental test equipment;

Kart Specialties, North Hollywood, speed equipment for karts;

Karlon Manufacturing, Inc., Van Nuys, metal stampings;

Hagemann-Nielsen Machine Rebuilding Co., Compton, Packard Bell Computer Co., West Los Angeles, computers for defense and industrial markets;

Electronics Center—Bendix - Pacific Div. of Bendix Corp., Sylmar, multi-million dollar electronics center for parts making and sonar testing;

Weston Instruments Div. of Daystrom, Inc., Monterey Park, measurement and control instruments;

Autonetics Industrial Products Div. of North American Aviation, Inc., Long Beach, computers;

Caldwell Engine Laboratories, Sun Valley, aircraft hardware;

K & D Co., Inc., Van Nuys, machine shop;

Triangle Business Machines, Inc., Los Angeles, industrial photo-copy equipment;

Metal Bellows Corp., Chatsworth, Arcturus Manufacturing Corp., Los Angeles, forgings;

Martin-Decker Corp., Long Beach, instruments for industrial and oilfield use;

Aluminum Division—Acme Metal Molding Co., subsidiary of Northrop Corp., Los Angeles, architectural aluminum;

Louis Levin & Son, Inc., Culver City, small lathes for making instruments and contact lenses.

Hot Motor Designed for Big Bomber

INTO THE OVEN: This unique high-temperature electric motor will play a key role in the throttle system of the Air Force's 2000 mph B-70 bomber. It is checked by North American Aviation engineers Harry Horii (left) and Larry Opel before entering environment oven to be subjected to 600°F.

PRODUCTION MACHINERY
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- Special Purpose Machines
- Transfer-Type Processing Machines
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Through every phase of the construction of a Greenlee transfer machine, Greenlee engineers maintain a close contact with you, the customer. They are strong on the buyer's viewpoint . . . know what cost-conscious management wants. They stay on the job from the time of initial planning until your machine is operating at full efficiency. This last phase—the proving out period—is especially important. Greenlee men are extremely helpful in bringing your machine up to full production . . . training your operators to keep it producing profitably. Call Greenlee. Let them show you how cooperative teamwork can benefit you.

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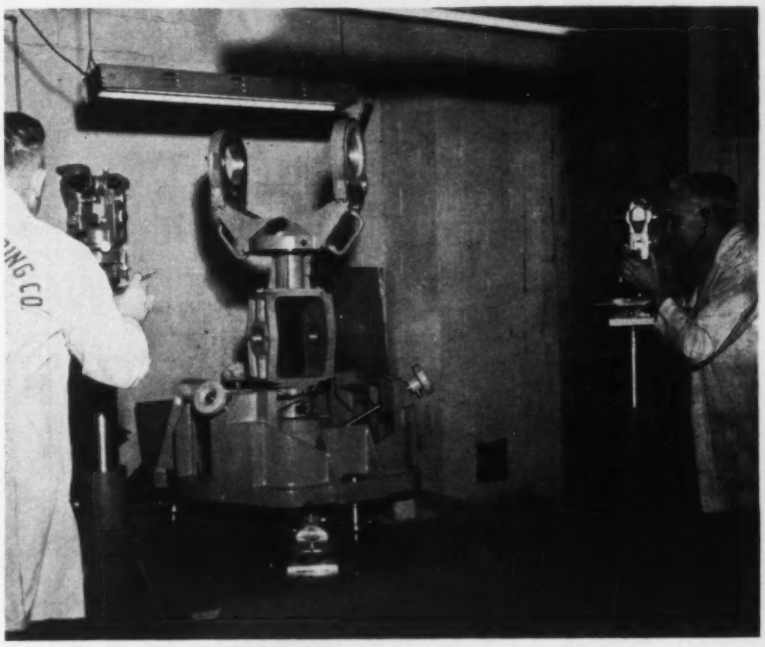
Precision Rules Space Tooling

Missile Test Stands Pose Special Problems

Aerospace tooling calls for the ultimate in precision techniques and skilled craftsmen.

Makers of complex electronic brains rely on the practical know-how of smaller shops to meet these exacting demands.
By R. H. Eshelman



SPACE CHECK: In build-up of highly accurate planetary test stand that puts missile guidance "brains" through their paces, inspectors rely on optical eyes such as theodolites and autocollimators to assure accuracy.

■ Fabrication of exotic vehicles for outer space present earthbound suppliers with unusual problems.

Makers of complex electronic guidance brains for missiles and rockets still rely on the practical tooling know-how of smaller shops.

There are many demanding specifications in making planetary test stands for such space equipment, Schwartz Boring Co., Inc., reports. Requirements may call for technical help from other members of the Detroit Tooling Association, in addition to this firm's specialized knowledge of precision boring, grinding and machining.

Ultimate in Skill — Aerospace tooling takes the ultimate in skilled craftsmen, precision techniques, equipment, optical instrumentation.

The test stand that checks out automatic guidance components demands alignment to within one second of arc, no measurable shaft end-play, uniform rotations within 0.005° per hour, and precision Class 3 fine pitch gears with a total composite error of only 0.00025 in. per in.

Before Missiles—The test stands are precision electro-mechanical fixtures. They permit test function and drift of the gyro-stabilized platform systems before installation in missiles.

So the test equipment performs a vital function. It can precisely counteract the effect of the earth's rotation, to establish a space-fixed reference to calculate platform drift.

The five moveable axis of each stand must have positive return alignment to neutral positions within one second of arc.

Any errors in test equipment would be multiplied in the final space guidance components. That's the reason for the precision.

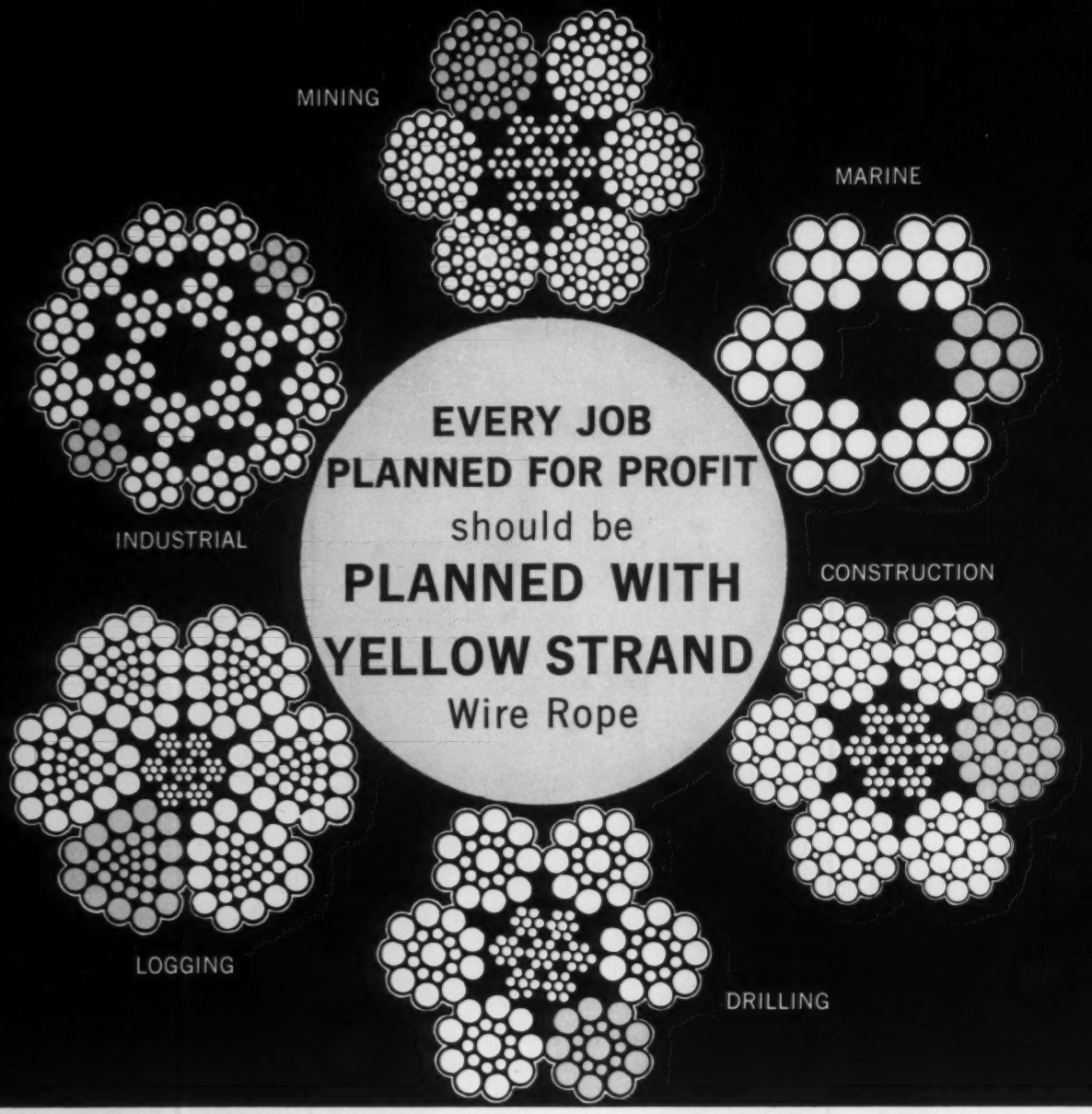
Critical Gear Box — Precision machining, grinding and assembling of test-stand components is done in a temperature and humidity controlled plant. Gears for the highly critical gear box (which has a ratio of approximately 1,000,000-to-1) are ground from the solid on Reishauer gear grinding machines.

Inspection of the gears is done on Fellows Red-Liner and involute checkers. Readings for each gear are recorded. All ball bearings are hand selected and rigidly inspected to conform with Class ABEC-9.

Special Plate—Final inspection of the planetary test stands is done on a special granite surface plate that is flat within 0.000020 inch over its entire surface.

To avoid vibration, the surface plate is mounted on five air cushions, each having a position-sensitive needle valve to keep the plate constantly level.

Among optical instrumentation used for final inspection of the planetary test stands are autocollimators, autocollimating theodolites, magnetic mirrors, and optical squares.



There's a Yellow Strand Wire Rope for Every Job. Designed to Hold Down Costs—Lift Profits!

Yellow Strand wire rope is not the cheapest—but the **best value.** Its economy is measured in **profits,** not price. The Yellow Strand is a promise of superior strength, durability and resistance to abrasion and fatigue. Whatever your wire rope need, you will find a Yellow Strand, Yellow Strand "POWERSTEEL," or Yellow Strand Flattened Strand wire rope profitably perfect for you.

A "Yellow Strand Man" is available anywhere, anytime

He's available through your Broderick & Bascom Distributor to advise, help or solve problems. And remember, Yellow Strand wire rope is always on hand—a maximum of 4 hours for regular orders—24 hours for special orders.

SLINGS AND CLIPS

There's a complete selection of Yellow Strand wire-rope slings (made to your special order, too) and Yellow Strand wire-rope clips. Try them next time.

Yellow Strand®
WIRE ROPE

BRODERICK & BASCOM ROPE CO.
ST. LOUIS • PEORIA • HOUSTON • SEATTLE

H. A. Denny, elected vice president and general manager, Engineering and Construction Div., Koppers Company, Inc.

Kutztown Foundry & Machine Corp.—**P. M. Herring,** named president.

Pacific Car & Foundry Co.—**R. D. O'Brien,** elected president.

National Twist Drill & Tool Co.—**W. E. Atchley,** elected vice president, sales; **R. F. Supernaw,** appointed chief metallurgist; **F. D. Lamb, Jr.,** appointed general sales manager; **H. M. Easton,** is now asst. general sales manager.

Pittsburgh Metals Purifying Co.—**W. D. East,** appointed vice president, manufacturing.

U. S. Steel Homes Div., U. S. Steel Corp.—**H. R. Black,** appointed vice president, sales.

Motorola Semiconductor Products Inc.—**J. L. Gray,** named vice president and eastern area sales manager.

Michigan Seamless Tube Co.—**W. B. Baisch,** elected vice president and general manager.

Driver-Harris Co.—**W. A. Marshall,** appointed asst. vice president and manager, manufacturing.

American Screw Co., Div. of Noma Lites, Inc.—**J. J. Coy,** elected vice president, sales.

A. P. Green Fire Brick Co.—**M. D. McClain,** elected vice president.

Fort Wayne Metals, Inc.—**Frank Leonard,** elected vice president, research and development.

Nuclear Corp. of America—**J. S. Rydz,** named executive vice president.

Weirton Steel Co., Div. of National Steel Corp.—**J. T. Mayhew,** promoted to asst. manager, and **B. W. Jones,** to galvanize superintendent, Sheet Mill Dept.

Alemite and Instrument Div., Stewart-Warner Corp.—**P. F. Allmendinger,** appointed manager, engineering.

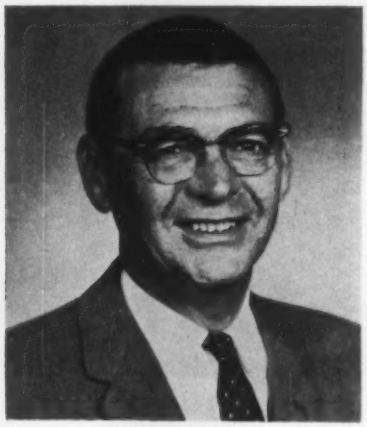
C. S. Beshore, appointed manager, manufacturing, Yale Materials Handling Div., The Yale & Towne Manufacturing Co., Philadelphia.

Textile Machine Works—**W. P. Porch,** appointed treasurer.

Penn Metal Company, Inc.—**D. M. Eads,** appointed Chicago district sales manager.

Oil Well Supply Div., U. S. Steel Corp.—**M. F. Hazel,** named executive vice president; **W. A. Weir,** named vice president, sales; **J. E. Chenault, Jr.,** named area manager.

(Continued on P. 98)



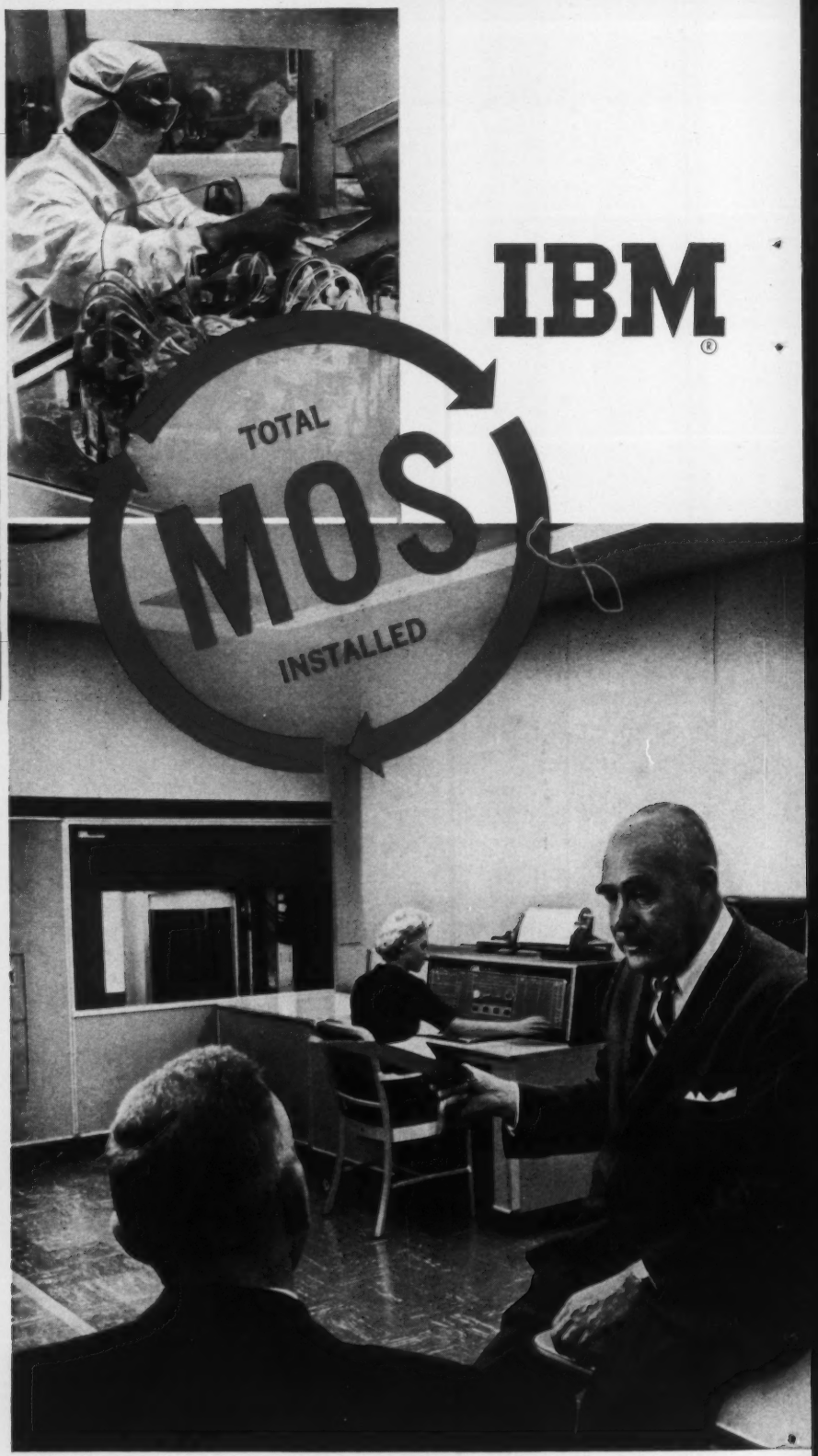
L. B. Emlet, appointed a vice president, Union Carbide Nuclear Co., Div. of Union Carbide Corp.

E. H. Damon, elected vice president, administration, Strategic Materials Corp.

D. R. Borst, named treasurer, Inland Steel Container Co., Div. of Inland Steel Co.

No personnel shortages–MOS lets management know on a periodic basis what the future requirements will be for materials and personnel.

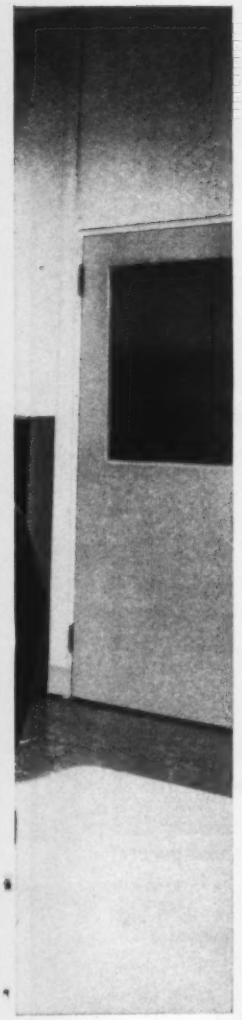
No product shortages–Periodic reports from RAMAC guarantees that American Cyanamid has adequate inventories at all times.



No delays in getting the facts–Mr. Henry Wendt, Jr., General Manager of American Cyanamid's Surgical Products Division, gets up-to-the-minute information with the help of the IBM RAMAC 305 Data Processing System.

Management Operating System

at American Cyanamid's Surgical Products Division



...speeds service through automatic inventory control

The *Surgical Products Division* of American Cyanamid Company handles over 1700 individual items at 43 locations. They now have continuous *automatic* control over manufacturing, inventory, and distribution.

This is accomplished by a new dynamic technique—IBM Management Operating System. Using IBM RAMAC® equipment, MOS coordinates planning and control functions continuously throughout the manufacturing cycle. MOS supplies accurate data in time for effective management decisions.

MOS automatically *inter-relates* the six major manufacturing control functions:

1. Sales Forecasting
2. Materials Planning
3. Inventory Management
4. Plant Scheduling
5. Work Dispatching
6. Operations Evaluation

Previously, updating of all this information had taken weeks. The result was a high back order position coupled with an excessive investment in inventory. It also made it difficult to schedule and operate the plant at the highest economy level.

Today, American Cyanamid's MOS provides current control on all phases of production, distribution and manufacturing. It gives management all the information needed to cut back orders, to reduce inventory investment, and to increase plant efficiency.

MOS offers comprehensive control

Only with the total approach provided by MOS can you get such coordinated effort, such complete information, such tight operational control. Only with MOS can you study *in advance* the effects of the decisions yet to be made.

For more complete information call your local IBM office.

IBM® DATA PROCESSING

(Continued from P. 95)

Canadian area; **R. L. Armstrong,** named area manager, Rocky Mountain area.

Aluminium Limited Sales, Inc.—**S. M. Treat,** appointed New York district sales manager.

Data Recorders Div., Consolidated Electrodynamics Corp.—**H. I. Chambers,** appointed director, engineering.

The National Malleable & Steel Castings Co.—**A. M. Wehrmann,** appointed director, personnel.

National Forge Co.—**M. L. Billow,** named marketing manager, special products.

Carriage Goods Div., The Brewer-Titchener Corp.—**E. C. Telling,** named manager.

Toledo Div., Dana Corp.—**Von R. Kaufman,** appointed manager.

Lewis Steel & Aluminum Co., Inc.—**E. J. Goetz,** appointed manager, sales.

The Brush Beryllium Co.—**M. B. Powers,** appointed manager, sales administration.

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In addition to a wider work range, the Varistroke principle reduces die travel and slide velocity to a minimum. Because of this, the die set, die, slide, gibs, etc. wear much slower, adding low maintenance cost to the list of features that have made the Zeh and Hahnemann Press line preferred in the field.

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- *only 2 additional parts*
- *costs only a fraction of total press cost*
- *minimum slide velocity*
- *reduces machine and die maintenance*
- *wide range stroke from ½" to 1½" & 1" to 3" on larger presses*

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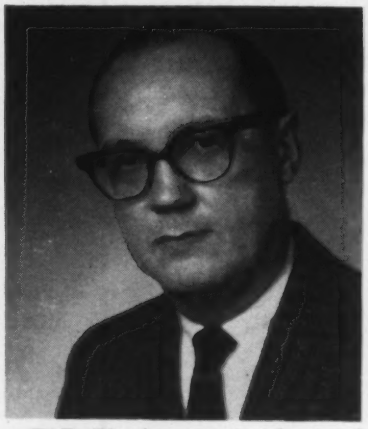
Hughes Aircraft Co.—**R. M. Sweeney,** appointed marketing manager, radar; **G. L. Sharp,** appointed marketing manager, operations; **S. J. Evans,** marketing manager, computer; **R. P. Andelson,** coordinator, district offices; **J. E. Godwin,** marketing manager, systems; **L. S. Anderson,** marketing manager, displays.

L. F. Schurck, appointed general works manager, Cooper Alloy Corp., Hillside, N. J.

Chase Brass & Copper Co.—**H. L. Burghoff,** appointed director, research and development.



T. R. Blessing, appointed general purchasing agent, The Beryllium Corp., Reading, Pa.

Metal Div., National Lead Co.—**E. A. Torney,** appointed sales manager, primary metals, New York City headquarters.

Jones & Laughlin Steel Corp., Stainless and Strip Div.—**S. O. Schaefer,** named Detroit plant in-

dustrial engineer; **R. L. Watterson,** appointed plant industrial engineer, Louisville.

Dr. T. T. Magel, appointed director, quality control, Allegheny Ludlum Steel Corp.

Latrobe Steel Co.—**E. F. Kruzynski,** named manager, Production Control Dept.

Electric Autolite Co. — **J. L. Gage,** named chief product engineer, new Decatur, Ala., operations.

R. F. Groves, appointed director, personnel, Alan Wood Steel Co.

Rockwell-Standard Corp., Grating Div.—**T. K. Brunner,** appointed sales manager.

Rigidized Metals Corp.—**J. S. Hitchman,** appointed general sales manager.

Kaiser Steel Corp.—**W. P. Pierce,** appointed asst. to the general traffic manager.

Albion Malleable Iron Co.—**N. A. Birch,** appointed technical director.

Denison Engineering Div., American Brake Shoe Co. — **Phillip Shrider,** named a field engineer, upper New York State area.

Stromberg-Carlson Div., General Dynamics Corp.—**Dr. D. T. Blackstock,** named a senior physicist.

Alloy Metal Products, Inc.—**R. P. Lawrance,** appointed field engineer, nickel sales.

Taylor Fibre Co.—**J. L. Wilson,** appointed manager, newly-created Filament-winding Div.

OBITUARIES

R. N. Heald, 64, former president and chairman of the board, The Heald Machine Co.

A. E. McCormick, 66, former treasurer and asst. secretary, Revere Copper & Brass Inc.

G. A. Price, 62, asst. vice president, sales, Chicago, U. S. Steel Corp.

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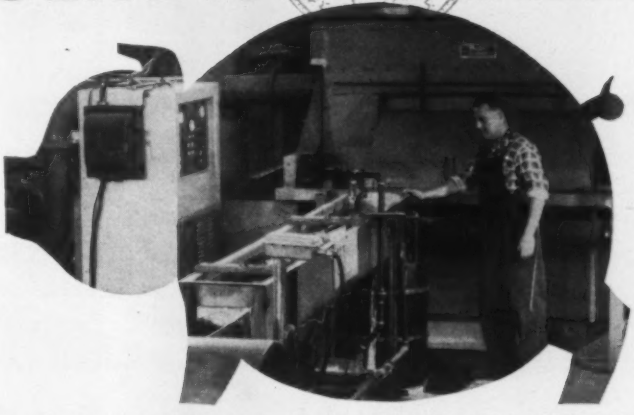

An experimental installation for removal of residual smudge from shot blasted strip by means of ultrasonics. A joint project of Pangborn Corp., Wean Engineering Co., Inc., and Branson Instruments, Inc.

The shotblast method of descaling strip is becoming more and more popular, especially among the lower tonnage producers, converters and fabricators. In this process, hot bands are descaled in a blast cabinet with abrasive shot.-Today ultrasonic cleaning is on the way to replacing flash pickling. This method, which eliminates stream pollution and acid disposal, offers many extras:

• LOW INITIAL INVESTMENT (for tanks due to inexpensive steel construction) • LOW MAINTENANCE COSTS • LOW OPERATING COSTS (in terms of heat and power input) • REDUCED OPERATING TEMPERATURES • LITTLE OR NO CORROSION • NO FUME REMOVAL • NO ACID DISPOSAL • SPACE SAVING (ultrasonic installations are shorter in length).

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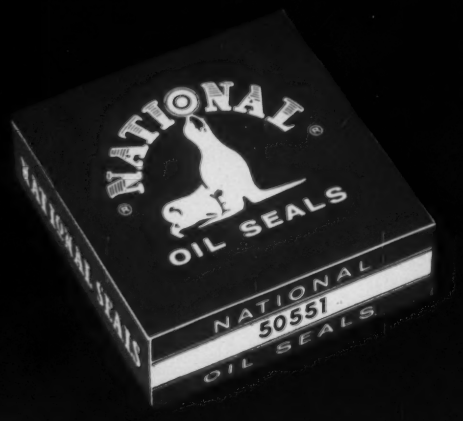

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Survey Space Program

Congress is preparing to survey the U. S. space-booster program. Hearings will be held this month by the House Committee on Science and Astronautics to consider: The apparent duplication of effort between the Air Force and NASA; the high cost of booster development; the feasibility of single agency responsibility for space booster systems; funds needed to pursue the program.

Metal Seal Resists Heat

A new all-metal seal handles hydraulic pressure under the extreme conditions encountered by missiles and supersonic aircraft. The seal, made of high-temperature alloy steels, performs satisfactorily at temperatures up to 530°F and pressures up to 6000 psi. Company scientists hope to adopt the principle to a new series of seals aimed at ultrahigh-pressure applications.

Develop Machining Formula

A formula for predicting machinability of new materials will soon be verified. Research tests are half completed. The project, sponsored by the National Science Foundation, may be completed this year. Some of the refractory metals are included in the study. Results should prove highly interesting to aerospace manufacturers.

Space Suits for Industry

The survival suit system, designed to keep man alive in outer space, has come down to earth. It may lead to startling innovations in fire-fighting, medicine, manufacturing and even in the American home. The metal and chemical industries will use such suits to carry on processing techniques in unnatural environments.

Inspection: On Way Out?

The Army Quartermaster Corps is among those who are relying more on statistical analysis and less on thorough inspection for purchased items. According to a major aluminum company, the Quartermaster Corps is going largely by the historical performance of suppliers in figuring the probability of defects. If this rating is good enough, inspection may be eliminated entirely.

Minuteman or Polaris?

U. S. A. F. officials say the success of the recent Minuteman ICBM firing puts it on an equal basis with the Navy's Polaris. Since the Minuteman costs much less—$700,000 less per missile, they say—these Air Force officers will seek to replace the Polaris with the Minuteman as the nation's first-line defense missile.

Steel and Plastics Team

Rocket-nozzle liners of phenolic plastic, impregnated with asbestos-reinforcing fibers, offer a successful means of countering 5500°F rocket-engine heats. The inserts allow use of steel nozzles of lower temperature resistance than has been feasible in the past. The steel-plastic combination allows a cut of 40 pct in overall nozzle weight. The phenolic-asbestos combination is the same material used in earlier missile nose cones.

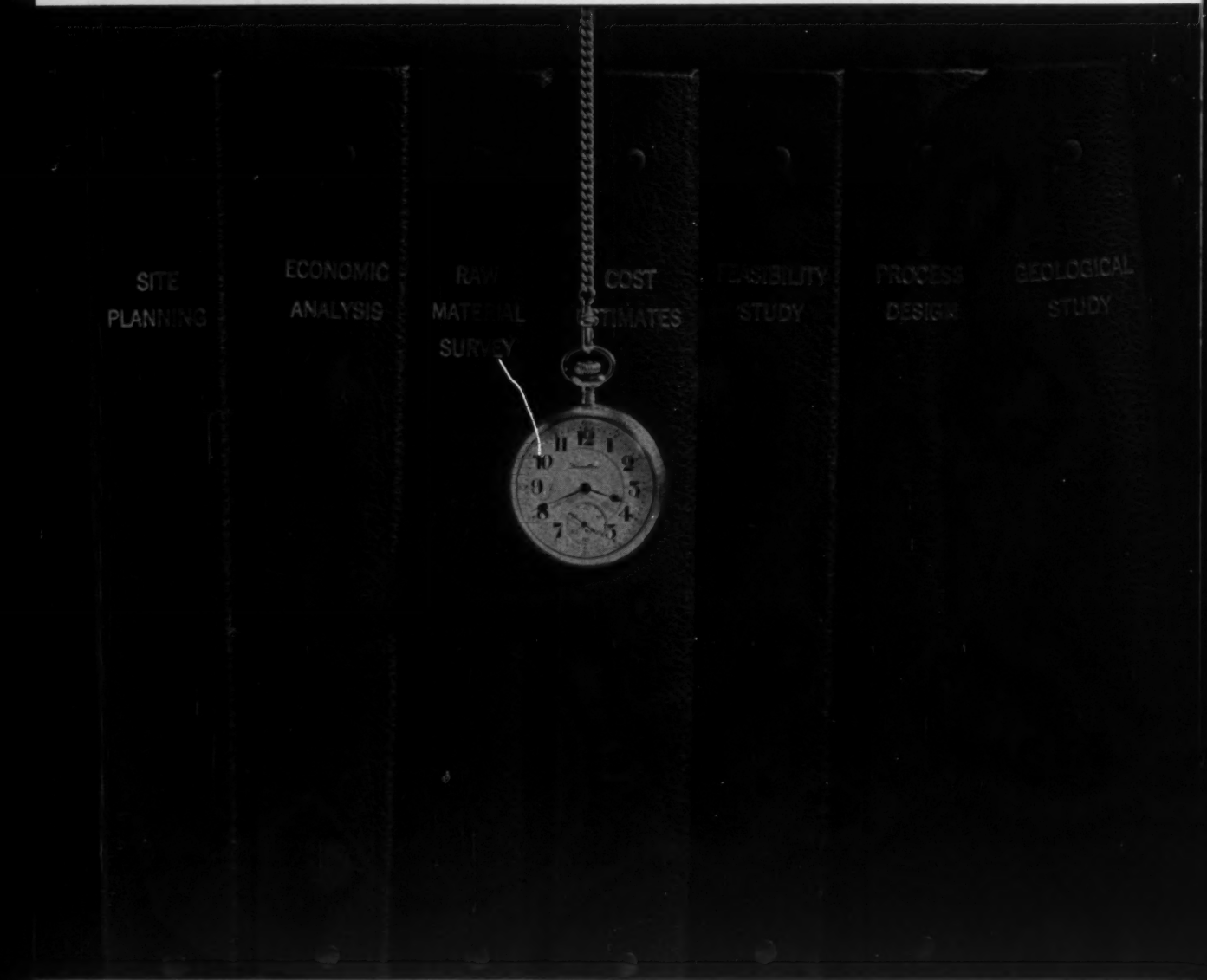
How to Forge Steels

Want to know how to forge high-strength steels? The latest Defense Metals Information Center report discusses forging traits, design limitations, dimensional tolerances and quality control problems of martensitic steels heat-treated to strengths ranging from 240,000-300,000 psi.

Put Heat Into Workpiece

The knotty problem of machining high-strength temperature-resistant materials is the subject of intensive research. Results indicate that raising the temperature of the workpiece greatly increases metal-removal rates. Present studies are considering radio-frequency resistance heating as a heat source for the workpiece.

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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How to Boost the Efficiency Of Supervisory Personnel

By **S. A. Tucker**—Partner, Martin & Tucker, Little Neck, N. Y.

Money talks. Especially if it's already in your pocket.

Year-end bonuses are fine. But they're often forgotten in week-to-week working efforts.

On the other hand, direct rewards in regular-salary checks keep top men on their toes.

■ When people work for you, do you get what you pay for? How can you get them to work harder, more creatively, more carefully, more productively?

Obviously, the answer to the first question depends on whether or not you measure their work and gage it to their pay. Finding ways to reach the goals of the second query, offers one of the most challenging and rewarding tasks that face management.

Payment for Time — From a work-measurement viewpoint, an average salary represents payment for weekly- or monthly-attendance time. This payment for time is not in itself a stimulant for getting people to reach higher working goals.

Each of us has within us a latent potential and a high capacity for doing several times better than what we're doing now.

How can you get more and better work from executives and supervisors? First, identify the elements of work directly under their control. Then set performance standards for these elements. Use extra pay as a reward for improvements.

Optimum Productivity — Long ago, industry found out that by gaging factory work and basing factory workers' pay on such measurements, productivity soars. This stimulus has the effect of putting the workers in business for themselves. Once the workers know that they're masters of their pay checks, they forget all about previous output levels. Thus, they drive forward for more earnable pay.

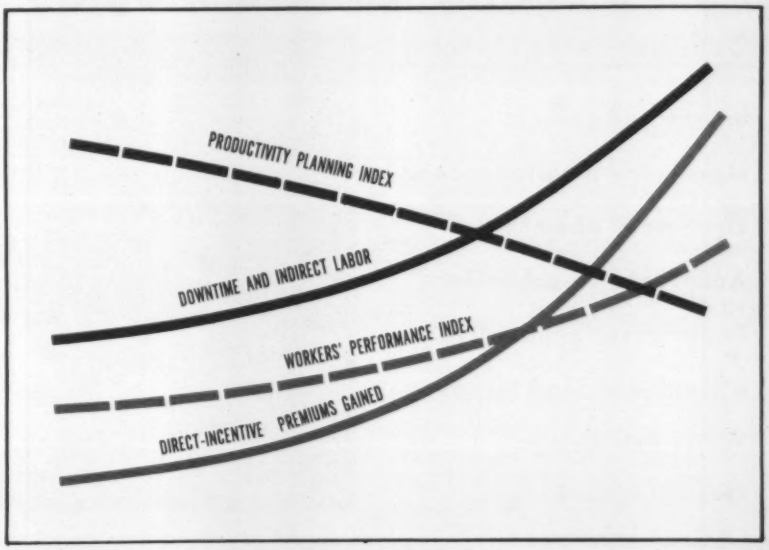
Unfortunately, financial-incentive plans for executives and supervisors don't enjoy the same popularity as incentive plans for factory workers. Why? The reason seems to lie in management's inability to identify and measure the work areas handled by these employees.

In applying incentives, there must be objective measurement. Also, there has to be a way to gage the performance of a task. Doing this implies that expected job performances are known by the job holders. This may be another reason why management is wary of such plans.

Yet, scientific management has progressed to the point where it realizes that all men have certain latent talents and capacities. If these are handled properly, this unused potential can be put to work.

False Incentives—With this realization, companies use various incentive-plan schemes. They hope these schemes will produce the same day-to-day stimulation as that

Avoid Excessive Premiums



obtained from production-incentive plans.

These schemes take many forms. These include profit-sharing, insurance and pension plans, stock-purchase options, year-end bonuses and increased community status. In actual practice, these plans don't provide an incentive stimulus.

Fringe Benefits—They don't reward a man for his own increased efforts. Instead, the reward is based on the combined effort of an entire team. These plans function as fringe benefits. They do not insure a constant incentive.

Since these plans have no cause-and-effect relationship between performance and reward, the men simply accept whatever comes along. There may be spurts in their efforts, but there is rarely any day-to-day sustained high-level activity.

Such activity typifies the drives of production wage-incentive workers. It's this type of effort which improves and protects a company's profit-making ability.

Up and Down—Executives and supervisors are not naive. They soon come to regard these plans as: Goodwill, partially-deferred income and pie-in-the-sky.

Profit-sharing and the rest are fine for rewarding loyalty and longevity. But they don't raise the average performance level of a factory supervisor—once he realizes that company profit can go down in spite of his peak capacity.

When company profits are high, supervisors get a windfall. However, when the company has periods of low earnings, supervisors get little or nothing.

Some supervisors may do an outstanding job during low periods. Thus, they protect management against further losses. Profit-sharing schemes don't provide for this. And, of course, by the same token a supervisor could be creating excess costs in periods of high profits.

Choose Proper Plan—How should executives and supervisors be rewarded for extra performance? How effective is your plan for giving these men extra pay for extra work? To answer these questions, let's study the answer to two test questions.

On what basis do you grant salary increases to your executives and supervisors? When one of these men comes to you for a raise, how do you decide if he deserves it?

The last two questions produce all types of answers. Here are a few.

"Because I think he's doing a good job." "I've noticed how hard he works." "He's been here a long time." "I always see him working late at the office." "Because if I don't give it to him, he'll quit."

Effective Incentives — When fair financial incentives are given to executives and supervisors, the need for traditional salary increases fades away. Two years after one company installed such plans, everyone knew that raises were out. They accepted this cheerfully.

A sum of earnable increases was substituted. This program outstrips the usual raises. And it benefits management. Along with higher productivity, management's task of managing became easier.

With proper supervisory incentives, management keeps itself informed. This pinpoints internal improvements and shortcomings. Quick solutions to production problems improve a company's economic strength.

In short, the plans get the men to examine and police all the areas under their control. Heretofore, they had been "too busy" to do anything about most loose ends. In effect, the men are now in business for themselves.

Keep it Simple—Let's see what's involved in starting a plan of this nature. We can best do this by noting what makes production-wage incentives effective. Under a production-wage-incentive plan, workers are told that so much production per hour will give them so much pay. The more they produce, the more they earn.

If a worker's production standard is 100 parts per hour, he knows he has to exceed this level before he gets extra pay. Since he works directly on the job, he knows when and if he hits this standard.

When he raises his output to 130 parts per hour he knows how much

Plan a Sound Reward Program

Consider these factors:

Waste and rejects

Machinery maintenance

Equipment downtime

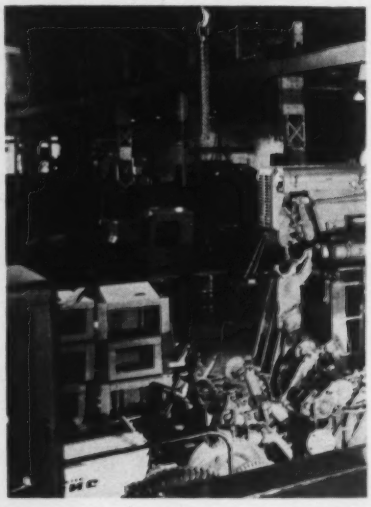
Adherence to schedule

Department productivity

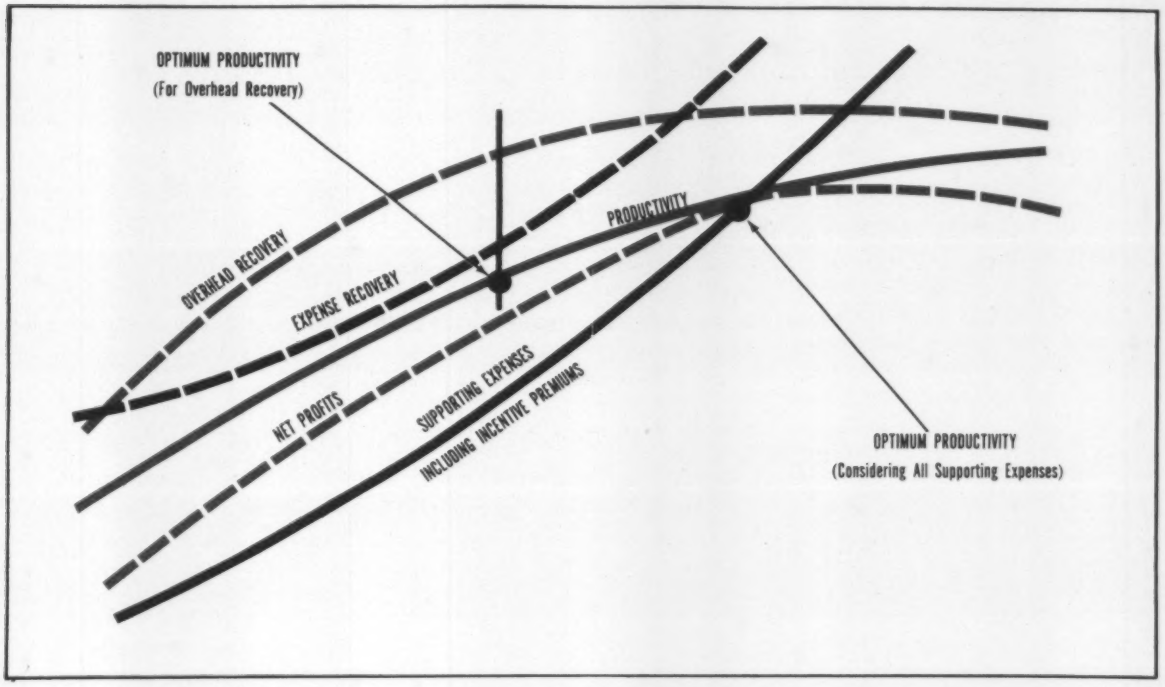
Absenteeism and turnover

Waits and delays

Overall housekeeping



Incentive Costs Affect Optimum Production



money he will get. Therefore, he can calculate in advance just what his gross earnings will be.

Identify Problem—In planning a worker's incentive, his job is fully identified. It's measured to gage a reasonable return for his wages. Then, the level of bonus money is decided upon. Finally, performances levels on the job are recorded and evaluated.

Of major importance is that the worker is measured by what he directly controls, namely his rate of output and working quality. He isn't gaged by something over which he has no direct control, like profits.

This stimulates his working appetite. He knows what to do to get more money. The reins are in his hands. He can see the final objective, control it and change the factors that influence it.

Can this be said of the nonproductive job? Let's consider a case in point.

Money Talks — In one plant, operating with an equitable supervisory-incentive plan, foremen know that increasing their indirect-labor load by 10 pct reduces their bonus pay by 3 pct. Formerly, these foremen called for extra people whenever they faced a bottleneck in work flow.

Had they planned their jobs better, this extra labor wouldn't have been needed. This was considered in setting up the foremen's work standards.

Dual Factors — When a supervisory-incentive plan was installed and carefully explained, the foremen realized that better planning would help the company, while boosting their bonus pay.

Of course, they always had the company's interests at heart. But this was a passive interest. It's too weak an incentive to motivate them into doing something concrete about improving job performances.

It's interesting to note that 6 weeks after the plan became effective, most of the foremen pared their indirect-labor crew to 60 pct of what it had been for the last 8 years. They did this without restricting operations. No doubt, money talked.

Too Many Premiums—The first chart shows what happens when long production runs are favored out of sequence with a fixed production schedule. Workers and supervisors gain more premiums. But this is accomplished at the sacrifice of increased downtime.

This can cause order cancellations. It may take management quite a while to find out why.

Note the dip in the productivity planning index. This index is the ratio of direct-incentive premiums gained, divided by the amount of downtime. When it dips, trouble is just around the corner.

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Ask for Reprint **No. 146.**

Reactor Gets Repair-Free Welds

Aluminum-Magnesium Alloy Meets Weldability Needs

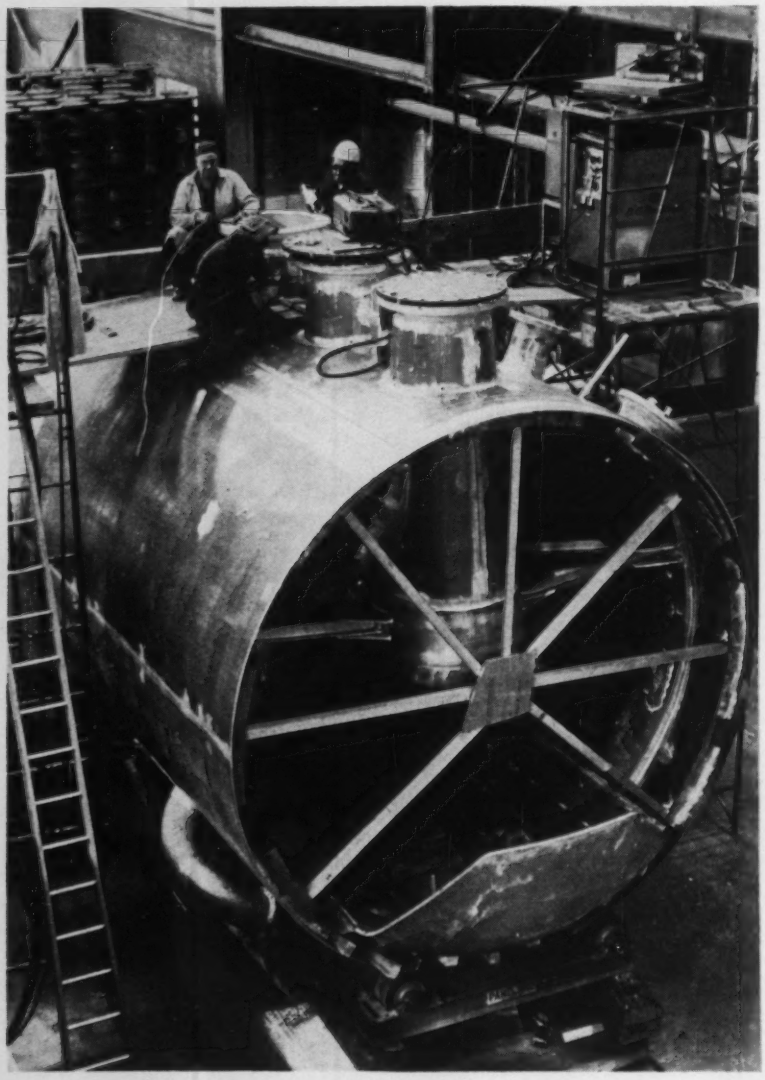
Perfect welds are a must in reactor fabrication. There is no chance for repairs once the unit starts operating.

Mig welding met this challenge with over four miles of flaw-free weld passes.

■ Welding is an important link in the construction of Canada's first natural - uranium power reactor. Sometime in mid-1961, at Rolphton, Ont., the prototype reactor will begin a 20,000 kw demonstration of Canada's nuclear future.

The reactor's success will depend on sound design and fabrication. Mig welding (metal inert gas shielded arc welding) is a boon to both factors. Flaw-free welds are not only a goal on this project, they're a must.

The truth of this statement is apparent. Once the reactor core, made with over four miles of weld passes, goes into use, it becomes almost inaccessible to weld repair.



MILES OF WELD: When completed, the reactor core will contain over four miles of perfect weld passes throughout its intricate body.

Alloy Selection—On a vast project such as the reactor, welding almost dictates the choice of alloy to be used. This choice was a major concern not only to the designers and welding specialists, but to technologists from Air Reduction of Canada and the Aluminum Co. of Canada, who are working with them.

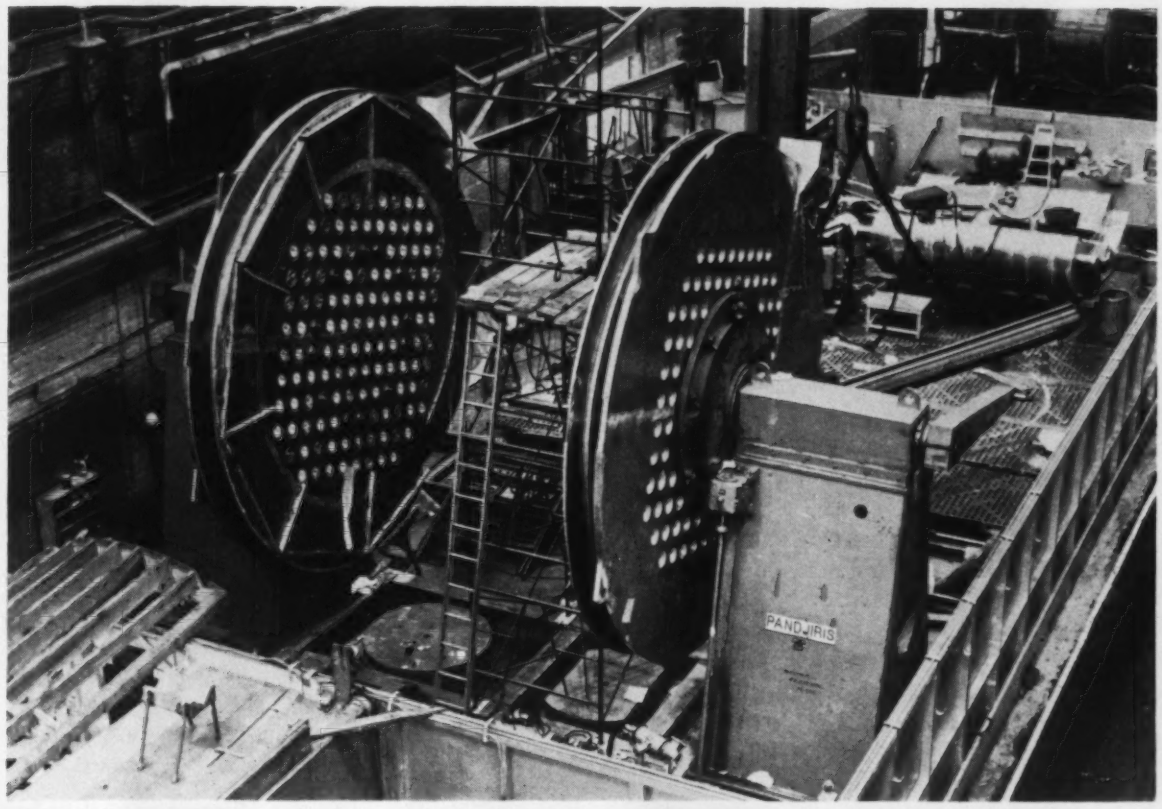
The material must provide the designers with enough strength, ductility and corrosion resistance, and still offer the welding people a material rating high in weldability. The aluminum - magnesium group got the nod.

To reduce crack sensitivity to a minimum, the welding specialists were anxious to select an alloy with the lowest possible sensitivity to hot-short cracking. These cracks result from inter-granular separation.

How Much Mg?—The susceptibility to cracking during welding becomes greater as magnesium is added to aluminum alloys, and reaches its peak with a content of about 1.5 pct. However, as the content is increased beyond this point, crack sensitivity is reduced.

Again, if the magnesium percentage gets too high, the material tends to show signs of stress-corrosion cracking and intergranular corrosion.

Alloys having a low magnesium content cannot provide enough



POSITIONS PLATES: The setup calls for a fully-automatic welding head. The head is mounted on the giant positioner with its welding guns set in specially designed jigs and fixtures, ready for action.

strength for a 200-ton unit when fully loaded. Therefore, a compromise was reached with the selection of a material having 3.5 pct.

The alloy is relatively new and untried outside the welding laboratories of all aluminum suppliers. However, it rated "A" in weldability.

Weld Requirements — The high weldability factor is necessary for the reactor core or calandria tank, since it is almost inaccessible to weld repair once in operation.

Before being accepted, every inch of weld must undergo every possible nondestructive test. Visual examination for cracks, radiography, liquid penetrant, thermal, hydrostatic and helium tests are considered routine.

All welds exceed commercial standards and meet or exceed the code requirements for boilers and pressure vessels. Welders, equipment, and materials must also meet rigid qualifying tests before being accepted for reactor work.

New Design Concept—The original plan called for a pressure-vessel-type reactor. This large vessel would contain both the moderator and coolant, whose function it is to control the heat of the reaction and convey its energy.

The current design employs several advanced concepts. These allow in-use refueling, natural uranium oxide as fuel, heavy water near atmospheric pressure as a moderator, and pressurized heavy water as a coolant.

The calandria tank, has over four miles of crucial weld passes. The unit is a cylindrical tank designed to rest horizontally in its vault.

The tank is about 15 ft long and 19 ft high. The inner shell is ¼-in.-thick aluminum and the outer shell is ½-in. thick. Between these walls are ¼-in. thick supporting ribs.

Automatic Setup—Because of the intricate shapes in the calandria tank, automatic welding is used whenever possible. The setup calls for a fully-automatic gas-shielded metal-arc welding head. The head is mounted on a giant positioner with the welding guns in special jigs and fixtures. All welds require argon as a shielding gas.

The welders employed on the job attend a special six-week training course. Every welded joint requires a written procedure. This procedure includes such variables as fluid and time factors for pre-cleaning, between-pass cleaning, exact electrical requirements, bevel angles, and minimum gaps.

Every precaution is taken against weld contamination. A light bulb in the wire spool container keeps feed wire completely free from moisture. Disk grinding between passes is used to avoid even the slightest porosity.

GM Uses Semi-Permanent Molds To Cast Aluminum V-8 Blocks

Developing the lightweight V-8 auto engine has not been a cut and dried affair.

A number of production innovations add to the successful use of the semi-permanent mold process.

■ An important milestone in metal casting is cited by Central Foundry Division of General Motors Corp.

At its Defiance, O., plant, the Division is mass producing aluminum cylinder blocks and heads for GM's lightweight V-8 water-cooled auto engines. More than 1300 blocks and 2600 heads can be turned out daily. The semi-permanent mold process is used.

Trims Engine Weight—How light in weight is "lightweight?" The standard gray-iron V-8 cylinder block, also cast by GM, weighs 250 lb. The new aluminum block weighs 76 lb, of which 18 lb are gray-iron cylinder liners.

The block and head designs adopted by GM for the lightweight engine could not feasibly be cast by any casting technique. A prohibitive number of metal chills was needed for green-sand casting. Diecasting presented coring problems. The job was very difficult for permanent-mold casting. Thus, it was decided to use the semi-permanent mold process.

How are the castings made? Many new developments and controls in materials and processes were required before high-volume production could be attained.

Special Mixture — Vital to the success of this process is a special sand mixture developed for aluminum coring.

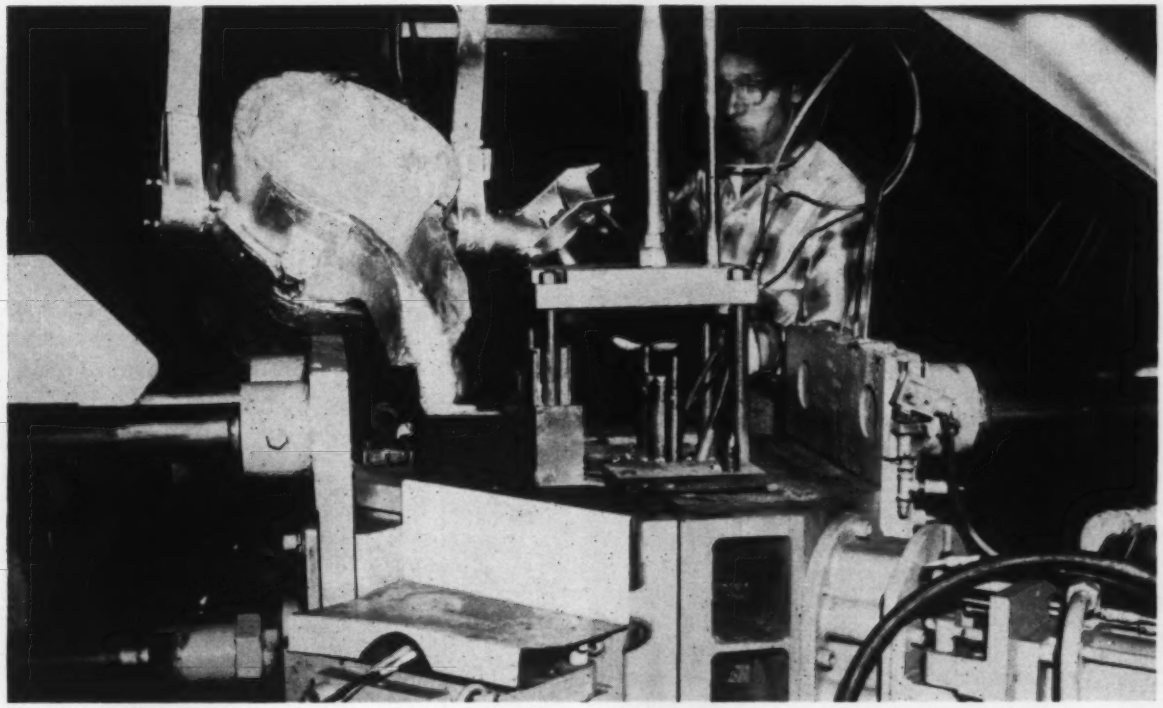
The metal used in the aluminum cylinder block and head castings is the aluminum casting alloy Type 356. In addition to top casting properties, this alloy features high strength, good corrosion resistance and pressure tightness.

New metal, clean scrap and chip metal are melted in four gas-fired, 40,000-lb reverberatory furnaces. The molten metal is fluxed and cleaned in the furnace. Then samples are taken for chemical analysis.

Molten aluminum is tapped directly into 1000-lb delivery ladles. The ladles are next transported by special truck to 1700-lb gas-fired holding pots on the molding platforms. Gas density is checked and controlled while in the holding pots.

How Many Cores? — It takes six sand cores to produce a cylinder-block casting. Four cores form the crankcase area. The other two form the water jackets. Sand cores are also used for the water jacket,

EASY TO REMOVE: Cores, made of the special urea sand mixture, have good collapsibility, says J. H. Smith, Central Foundry's general manager.



CASTS ALUMINUM: Dies have been hydraulically closed, and aluminum is being poured into the mold.

header, intake and exhaust ports of the cylinder heads.

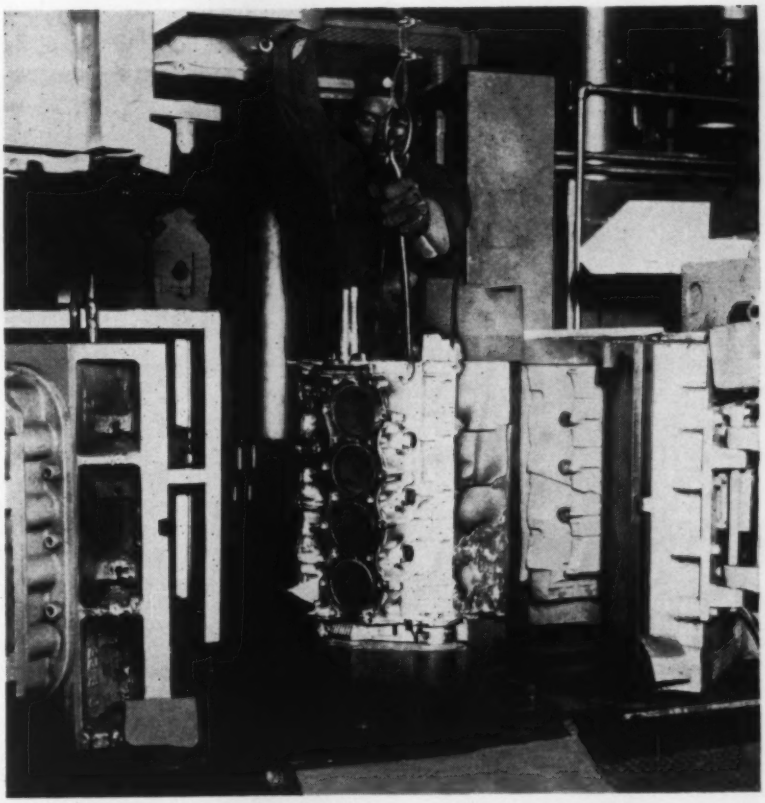
There are certain properties that cores must have for use in aluminum castings. Good collapsibility permits easy removal after casting. Low gas evolution during casting is also important.

To meet these needs, the special urea sand mixture was developed for aluminum coring. An added advantage is that such cores can be made with standard core mixing and blowing equipment and baked in standard core ovens.

From Muller to Silo—At the Defiance plant, core sand is mixed with urea formaldehyde, clay and water in a muller. After discharge, a belt conveyor system transfers the mixture to a silo. It can then be taken from the silo and transferred to core-blowing machine hoppers.

Standard semiautomatic core-blowing machines are used. The cores are then automatically stripped onto dryers and baked in vertical core ovens.

Baking time depends upon the core cross-sectional area. After bak-



NEXT COMES COOLING: After removal from semi-permanent mold, block casting transfers to a conveyor for a two-hour cooling period.

ing, the cores are processed, gaged and placed on racks for delivery to the aluminum molding area.

Carries Cores Away — All molding operations are performed on raised platforms. Belt conveyors, underneath the platforms, remove the castings. A continuous conveyor carries cores to all molding stations.

Castings are produced in special semi-permanent mold machines. These machines are hydraulically operated.

One unique feature is the pouring of the block casting in a vertical rather than the horizontal position used for gray iron blocks. The cylinder heads are cast in a horizontal position.

Relay the Data—There's a complete temperature control of metal permanent molds. Thermocouples relay temperature data to a master recorder on a control panel.

Pre-cast gray iron cylinder liners are heated while located on retractable mandrels in the molds. This is to facilitate handling and proper location. Grooves on the outer diameter of the liners increase the bond between the aluminum and iron.

Elaborate gages have been developed to check mold alignment and core locations during both setup and operation.

After the cores and liners have been placed, the mold is hydraulically closed. Molten metal is ladled from the holding pot and poured into the mold.

Lowers Onto Conveyor—After a brief solidification period, the mold opens; an overhead hoist removes the casting. It's then lowered onto a belt conveyor through an opening in the raised molding platform.

Block castings are then transferred to a cooling conveyor where they cool for a two-hour period. They then proceed to finishing operations.

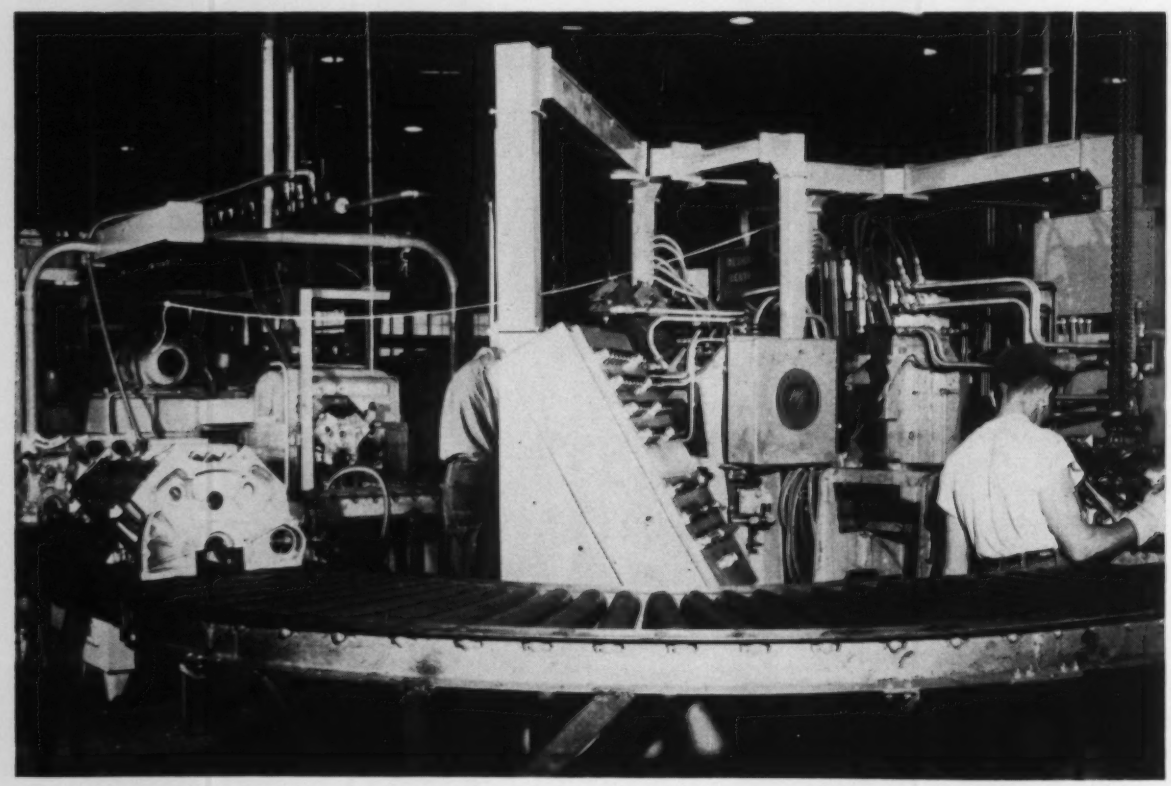
When cool, block castings are vibrated to loosen and remove core sand. A special definning machine then automatically breaks off the sprue and removes flush from the cylinder bores, water openings, and main oil galley.

Block castings are then shot-blasted in the crankcase area to remove any residual core sand. Special shakeout machines remove core sand from the heads.

Cleaning and Aging—After machining to remove flash and risers, the castings pass through a final cleaning operation and are then heat treated. Aging for five hours at 400°F relieves stresses and stabilizes the castings.

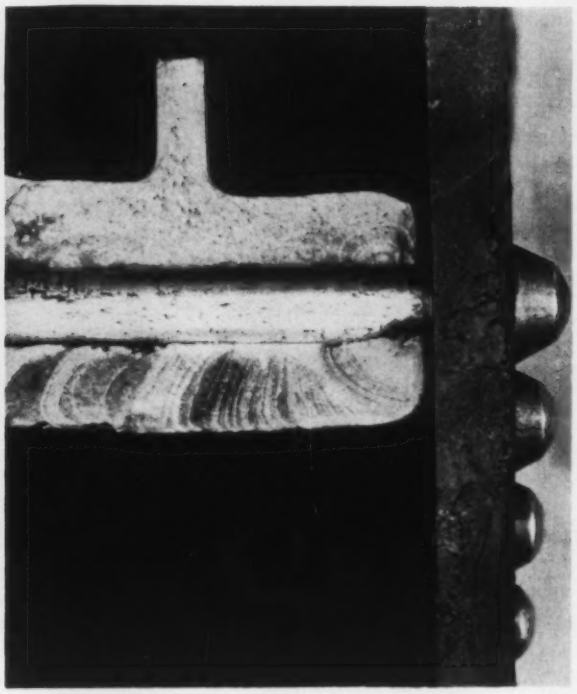
Inspection includes pressure testing and final gaging. Block castings get special attention. An automatic qualifying machine locates and mills both end and side targets in relation to the cylinder bores.

A special air - electronic gaging machine makes the final dimensional check. It locates on the milled targets and checks the location and surface finish of 22 separate areas, including all eight cylinder bores. Block castings are then ready for shipment.



FINAL TREATMENT: In block finishing area, excess metal is machined off before final dimensional check.

REDESIGN: Fatigue crack was due to fretting at bolt hole. How can other cracks be prevented?



ANY FATIGUE?: To avoid another failure, rivet holes must be X-rayed after so many flight hours.

Guard Against Fatigue Failures

By **J. B. Barriage**—Aero. Design Evaluation Engr., Federal Aviation Agency, Washington

Metal fatigue may be hard to avoid. But there are ways to cut down failures in aircraft.

One technique in wide use is the "fail-safe" method. The same approach could be applied to other industries.

■ As aircraft become more complex, new materials, designs and devices are used. At the same time, chances for service failures increase.

How can these difficulties be eliminated or controlled? First, whether it's wood or steel, the aircraft manufacturer must establish material quality.

Standards defining acceptable material flaws, inspection techniques, and alloy-deviation limits are factors in the evaluation. The material must conform to a specification which assures that the strength and other properties assumed in design will end up in the produced article.

Must Meet Specs—Of course, the purchaser must take steps to assure himself that the material meets the specifications. This is usually on a statistical basis. However, flaws are found occasionally during fabrication. Others, unfortunately, are found after failure of the part in service.

One example involves the landing gears on jet transport aircraft. The outer cylinder of the main landing gear oleo had fractured 360° on the circumference—in the area of the upper torsion-link lugs. The wing also suffered much damage. The large aluminum forging supporting the landing-gear downlock cylinder had about a 6-in. diam hole pushed in the web—a most costly secondary failure.

What Happened? — Can we expect this type of failure to occur in other aircraft? Since the cause may not be immediately evident, the Federal Aviation Agency (FAA) may specify limitations under which the aircraft may continue to run.

In this case, daily inspections were required. It was soon established that putting a spacer between the torsion-link lugs would improve the load distribution. Also, machining the sharp edge off the torsion-link lugs would reduce the stress concentration. These steps al-

lowed an increase in the inspection interval.

Consider this case. During the walk-around inspection of an aircraft, a fuel leak was noticed. Further study showed that the wing spar was cracked. It's shown in the first photograph.

Since the spar material was of proper heat treatment and composition, it was expected that other aircraft of that model could fail likewise. Mandatory inspection periods were set up.

Fretting Causes Crack—In time, it was established that the crack was caused by fretting at the bolt hole. This question arises: How long will the spar serve from the time the crack starts to complete spar failure?

In this case, as well as many others, it's not feasible to redesign the part. Instead, the manufacturer may have to conduct tests to verify that repair or regular inspection will maintain the aircraft.

Working with both aircraft and materials manufacturers, the FAA established an inspection period which was considered adequate. Since the area could not be inspected visually without extensive teardown of the structure, X-ray inspections were accepted.

Rivet Hole Is Source—The second photograph shows a fatigue failure of the front wing spar of a light airplane. It started at the inner surface of the rivet hole and progressed nearly one-third of the spar width.

The FAA and the manufacturer, working together, established X-ray inspection procedures. By means of an air-worthiness directive, all aircraft having accumulated a specified number of hours of time in service were required to be X-ray inspected in this area.

In another case involving a helicopter, there was a fatigue failure of the rotor blade. What caused the crack to originate in that area could not be determined.

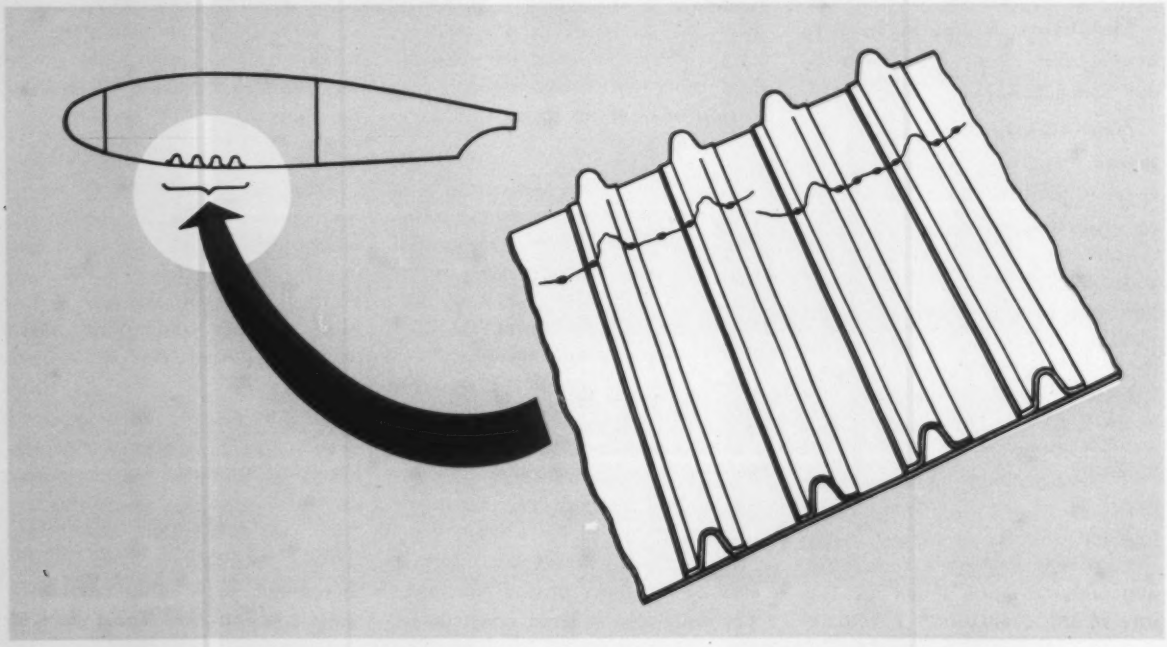
An air-worthiness directive was issued. It reduced the service life of these blades and called for an X-ray inspection program on all blades which had over a certain number of hours in service.

Find a Crack—The Military took similar safety measures. During their inspections, a main rotor blade was found with a fatigue crack extending about two-thirds around the periphery of the spar. Further study revealed the fatigue crack originated from an inclusion in the material.

Examination of other blades revealed scratch patterns like that on the blade that failed. These were finally traced to a manufacturing process. Since this condition could be expected to exist on all blades, it was decided to further cut the blade life and revise the inspection program. Also, the materials' producer and manufacturer revised their quality-control procedures and inspection methods on blades in production.

These cases indicate that service problems involving structural failures may arise from any number of causes. As the quest for improved structures, performance and efficiency continues, the job of the materials producer and aircraft designer becomes more critical.

"Fail-Safe" Approach Locates Crack



Recognize Fatigue — The emergence of fatigue as a design problem in airframes was due to the general trend in aviation. Transports were becoming larger; flight speeds and aircraft usage were growing.

In 1956, after much study and coordination with the aircraft industry, more specific criteria for fatigue evaluation were established.

Regulations provide the choice of either of two basic approaches to the problem of fatigue. These are fatigue strength (sometimes known as fatigue-life method) and fail-safe strength.

Lessens the Danger — Most new U. S. aircraft have been substantiated by the fail-safe method. Under this principle, the designer recognized that fatigue cracks and other damage are practically unavoidable. However, he minimizes the danger of failure by redesign. Result: a minimum rate of crack propagation. Fatigue testing must still be done to establish that defects can be detected before they become catastrophic. The fail-safe approach is practical. Past experience supports it. The third figure shows a failure discovered when searching for a fuel leak in the wing. The damage consisted of near severance of a 20-in. wide skin panel; and four stringers attached to the cracked skin had failed.

Many other cases were found in time. Another instance involving the wing of transport aircraft is shown in the fourth figure. Of course, corrective action was made mandatory in each case.

Checking Is a Must — The FAA recognizes the limitations in design, materials, and the effects of cumulative deterioration on the aircraft. Hence, it considers it necessary to assure that aircraft are maintained in a condition equivalent to that at original certification.

The FAA convenes a Maintenance Review Board for each new transport aircraft. Prior to the aircraft being used in airline service, representatives of the manufacturer and the airlines meet with the FAA to arrive at a minimum standard on structural inspection. Overhaul periods for the airframe, airframe systems, power plants, and associated components are set.

Thus, it may be seen that coordination of engineering design with aircraft operation and maintenance aims at keeping the aircraft in proper condition at all times.

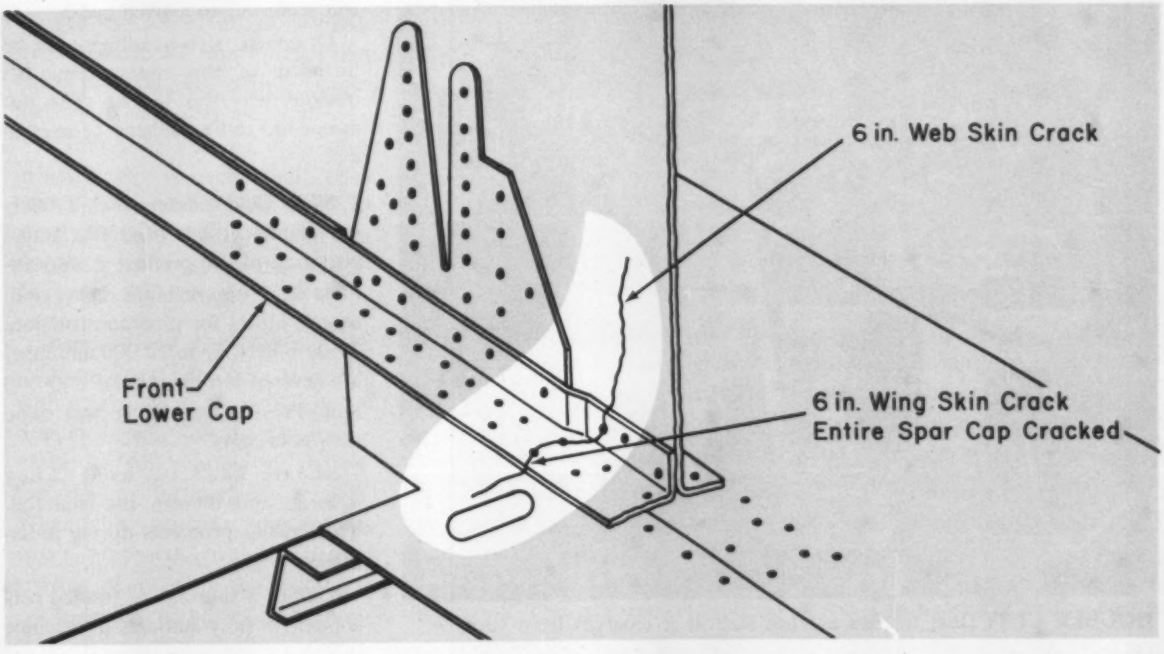
What's New?—The aircraft field is never static. Supersonic aircraft, for example, are now on the scene.

Design and construction of these aircraft involve new concepts. There'll be problems inherent in the development of new materials and methods of construction.

With regard to structural materials, there are many interrelated needs. For instance, strength-weight factors must be evaluated in the light of fatigue, high-temperature strength and creep, tear and corrosion resistance. At the same time, a service life of many thousands of hours must be realized.

Much thought is being given to a sandwich-type of construction. This involves high-strength, thin-gage materials. Correspondingly, it appears that optimum tolerances will have to get tighter to meet the demand for less structural weight.

Redesign May Prevent Another Failure



Automated Torches Cut Billets

Flame-Cutting Units Handle Hot and Cold Slabs

By **Richard Bechtle**—Director, Flame Cutting Machinery Dept., Adolf Messer, Frankfurt, Germany.

Flame cutting has found its place in German steel mills.

A completely automated setup transforms huge slabs into cut-to-length pieces. Output is 248 steel blocks per hour.

■ Electronic-controlled flame-cutting units are headed toward more overall automation. After finishing a single part, these machines cut multiple or single pieces continuously from large plates without any operator attention.

These machines also work from prints in which the parts are drawn in a ratio of 1:1 or 10:1. Bridged cycling allows parts to be cut from a large plate with no "lost" time.

Let's consider some of the new machines used in steel mills that achieve a large degree of automation.

Cuts Hot Slabs—First, we'll investigate a flame-cutting unit which cuts slabs at mill temperatures. Cuts are made right after the slabs leave a pusher-type furnace. The starting cut fixes the position of each machine by a given length. All machines move on wheels and tracks.

Variable cavity depths prohibit exact pinpointing of the initial cut. The first cut is made by two machines working against each other. It's possible to repeat a cross-sectional cut if the first cut was in the range of a cavity.

Motorized setups allow the position of the machines to be adjusted from a control board. However, the working pattern is fully automatic.

When a single button is pressed, the torches lower. They start to cut slowly. After making the first cut, they speed up. Upon completion of the cut, both torches shut off and move back to their starting points.

No Waste Problem—In this setup, the head- and foot-waste material falls at the same place. This speeds scrap removal.

Flame cutting takes more time than shear cutting. But the time is made up by having more machines cutting at the same time.

Now, we'll check out a practical arrangement which has been working for several months in a steel mill. A roller conveyer brings in the uncut slabs. It lifts them with cast-iron fingers.

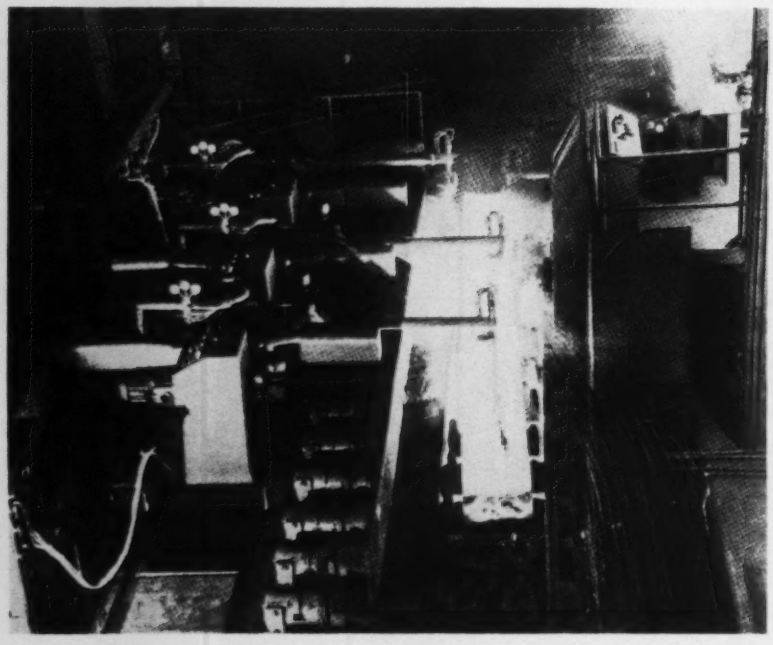
The conveyer's rolls continue to turn as water sprays over them. This prevents damage from falling slag. The entire setup is fully automatic. Any selected working pattern will run according to a given cycle.

Of course, slab handling can't be included in this automation. It's obvious why this is true. The operator has to fix the head or starting cut.

Slices Cold Billets—With a different flame-cutting machine, transportation of the product is also automatic. This machine cuts cold, square billets for pipe construction. These billets, up to 12,000 mm long, are severed into lengths of 300-600 mm. Previously, cutting was done with cold saws.

Shears can't be used. They squeeze and deform the material. This creates problems during pressing.

Due to a shortage of trained personnel, a fully-automated machine



DOUBLE CUT: Dual torches cut hot slab as it emerges from furnace.

now serves in this plant. Sizes of the billets range from 90-190 sq mm. Cutting speed is low in comparison to rolling-temperature cutting. For that reason, a machine was selected with four torches that work at the same time.

Fixes Length—A roller conveyer moves the billets along until they hit an adjustable stop. This fixes the desired cutting length. When all the billets hit the stops, the conveyer shuts off. Hydraulic fingers then push the billets sideways into the cutting position.

Next, the torch-suspension arm with its four torches lowers. The torches ignite automatically as the cut starts. After making the four cuts, the torches shut off and the torch-suspension arm moves back to its starting point.

While the torches are moving back, a hydraulic table tilts the four cut pieces. This lets them slide to a shipping area. As the tilting table reaches its horizontal position, more billets move on top of it. Thus, another cycle begins.

Resists Spray—To prevent "flame outs", all torches are back-firing proof. They also resist the slag spray.

The distance between each torch tip and the billet surface is fixed. Even though all four torches cut billets of equal size, there is chance that the billets may be bent.

Torch heights adjust themselves independently of each other. They smooth out height differences of about 50 mm. Also, they prevent the torch tips from hitting the billets and being damaged.

Insures Good Cut—Special calculations are needed prior to cutting with four torches. Even though hydraulic fingers push the billets into place, it's still possible for the billets not to lie perfectly straight. When this happens, the torches won't be exactly over the desired starting point of all the billets.

Generally, the billets are preheated at their starting point. Then the torches are driven back slightly as the oxygen-cutting valve is opened.

At this time, forward motion resumes. This guarantees a reliable starting cut.

The turning point of the tilting table, which slides the billets onto the conveyer, is outside of the cutting zone. This prevents the billets from jamming as they slide off. Although the machine automatically cuts and transports billets to and from the cutting table, the operator can alter the working cycle by using a pushbutton control.

For example, if a cut is interrupted by a billet cavity, the operator can switch on an ignition-wire feed. This boosts the heating energy.

Four Torches Speed Cutting

WORKING SEQUENCE	Cycle Time, seconds 90 sq mm Billets[a]	190 sq mm Billets[b]
Billets travel about 400 mm to cutting position	4	4
Adjustment of billets	2	2
Igniting and lowering of torches	8	7
Billet cutting, ±10 pct	33	74
Raise torches and shut off	3	3
Tilt table and remove cut parts	5	5
Reposition table	2	2
Total time for complete cycle	57	97

[a] Cycle yields 248 block pieces per hour.

[b] Cycle yields 144 block pieces per hour.

Gas Consumption Is Low

TYPE OF ENERGY	Gas Consumption, cu m 90 sq mm Billets	190 sq mm Billets
Consumption per cut		
Oxygen	0.13	0.5
Acetylene	0.01	0.04
Coke-oven gas*	0.03	0.12
Consumption per hour with four torches		
Oxygen	33	72
Acetylene	3	7
Coke-oven gas*	9	21

* Used with ignition wire for lead cuts.

Forecast Scrap Loss in Machining

Magnetic Inspection Reduces Wasted-Labor Costs

It's costly to machine a length of steel bar stock only to find a small percentage of it acceptable.

Magnaflux inspection can forecast losses before parts are machined.

▪ Probable part losses caused by marginal tube or bar stock can be forecast with usable accuracy. The quality control check will give a fairly good picture of the material's condition, and even more important, the check will let you know what percent of the stock is usable.

To set up the forecast, turn a sample of the stock to the part's finished diameter. Then, magnetically inspect the test sample to the same standard that applies to the finished part.

Percentage Check — One company uses a 1-ft long sample from a bar or tube in question to get a picture of the quality for the entire length. The first 2 in. of the sample are chucked in a lathe and the remaining 10 in., which in the company's case equals 10 finished parts, is turned to the final part size.

The sample is then checked by a magnetic method. The indications tell the rest. If there are five indications that fall on the surfaces representative of five separate finished parts, then the potential loss of the bar is 50 pct.

Usually, a tube or bar 12-15 ft long is sufficiently uniform in quality that a test on only one end is adequate. It is not necessary to heat treat and grind the test sample if a reasonably good machined surface is obtained, and the continuous wet magnetic method is applied.

In the case of heat treated material, only scaled or badly roughened tubes or bars need be ground. A mere surface darkening can be compensated for by using a fluorescent-type suspension fluid.

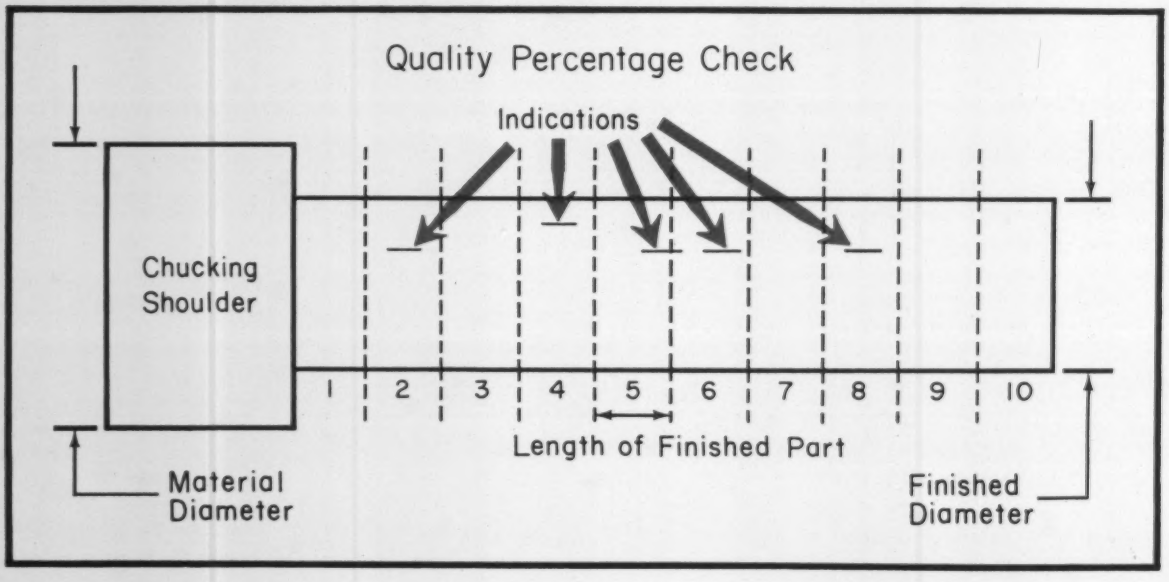
Draw the Line—In the illustration, dotted lines separate the test sample into ten imaginary parts which correspond to its length. Five imaginary parts show indications greater than acceptable. A 50-pct rejection will accompany the bar or tube from which the sample was taken.

Some test samples may have more than one surface to be inspected. For example, let's consider a race section. Normally there will be three surfaces located at different depths. Each surface should be machined and inspected separately.

If non-permissible indications are obtained after the first and deepest cut is made, someone will have to decide whether the indication will fall between the other surfaces to be machined. It's often possible that subsequent machining will remove them.

Indications other than those of open cracks seldom have any significance of their own.

Indications Help To Predict Parts' Quality



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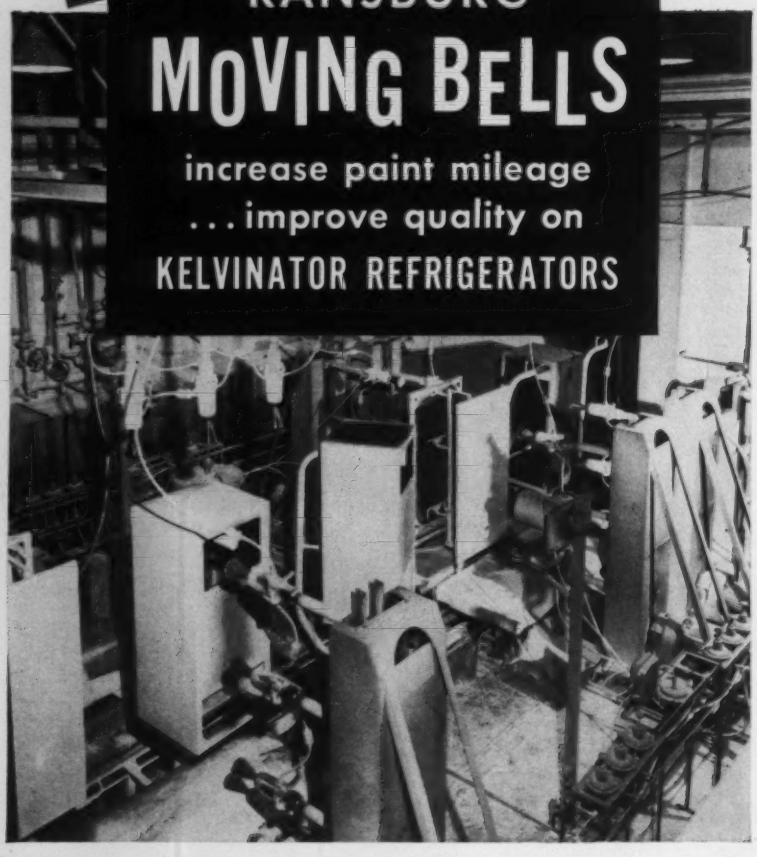

Ransburg's No. 2 Process moving bells—latest innovation in electrostatic painting—automatically paint mixed sizes of refrigerator cabinets and doors on Kelvinator's new finishing line.

On this job—first of its kind—limit switches re-position the reciprocating bells to accommodate various model sizes mixed on the same line. And, electric eyes selectively trigger the paint on and off between parts.

RESULTS? Automatic electrostatic spray painting—which replaced a battery of reciprocating automatic air guns—is providing Kelvinator with a beautiful, higher quality, and more uniform finish. Rejects, formerly a troublesome problem, have been practically eliminated. And, along with appreciable labor savings in this highly automated set-up, paint mileage is substantially improved . . . even bettering the savings indicated in pre-installation lab tests at Ransburg.

Like Kelvinator, other manufacturers of quality products will find Ransburg's moving bells the automation answer for production lines where batching of similar parts is impractical.

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RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

New Patents In Metalworking

Aids Steel Working

Process of working steel for preventing surface defects thereof, T. Ohtake, K. Ishizaki and N. Eguchi (assigned to Yawata Iron & Steel Co., Inc., New York), Jan. 17, 1961. In the hot working of steel containing copper and tin impurity, the surface of the steel is treated with a suitable metal sulfide. The steel is then hot worked at a temperature high enough that the sulfide is in a molten state. U. S. 2,968,092.

Treating Steel Strip

Method of heat treating silicon steel, G. W. Wiener (assigned to Westinghouse Electric Corp., East Pittsburgh), Dec. 20, 1960. Method of treating silicon steel strip to produce oriented silicon steel suitable for use in electrical applications. No. 2,965,526.

Compensating Alloys

Temperature compensating iron-nickel-copper alloys, C. A. Clark (assigned to International Nickel Co., Inc., New York,), Jan. 17, 1961. An alloy designed for use in compensator elements for magnetic indicating instruments consists of 23-28 pct Ni, not more than 0.03 pct C or Si, 6-11 pct Cu, and the balance essentially all Fe. U. S. 2,968,548.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

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Eight basic types of automatic polishing and buffing machines are described in a new illustrated folder. The machines are of the rotary indexing, continuous rotary, horizontal conveyor and straight line conveyor type. (Packer Machine Co.)

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Coke Costs in 1960

Now ready for distribution, 5-page research report based on actual 1960 figures, entitled: "Cost Comparison of Various Coke Production Methods." (Shailway Corp.)

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A two-page publication describes a line of vertical, squirrel cage induction motor from 60-4000 hp. These motors are particularly suited for vertical pump drive. They feature durable cage windings, heavy section frames, easy access, and selected long life bearings. (Electric Machinery Mfg. Co.)

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Submersible Pumps

An eight-page Bulletin describes a line of high capacity 3550 rpm and 1750 rpm submersible pumps for industrial, commercial, institutional and municipal water supply systems. (Sumo Pumps, Inc.)

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A new solution to the problem of blind fastening is offered in a product bulletin. The literature reviews the principle of operation of the unique one-piece, flush-mounting nut; suggests possible applications, principally in airframe, missile and comparable sheet metal applications; and details general specification data. (Standard Press Steel Co.)

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Miniature Transformer

A new catalog sheet describes how to determine production requirements in micro-miniature transistor circuits as well as impedance, mechanical and frequency response characteristics. (James Electronics Inc.)

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Prevents Porosity

A four-page bulletin discusses the problem of gas porosity in aluminum castings. The bulletin also treats upon a metallurgical compound designed to produce pressure-tight castings of maximum density. (Foundry Services Inc.)

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Sealed Switch

A one-page data sheet covers a new rotary actuated hermetically sealed switch. It includes details of construction, characteristics and electrical rating, and pricing information. (Micro Switch.)

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A four page bulletin, full details a full line of set screws that contain a nylon insert. The insert prevents burring or nicking of precision shafts, and insures locking power. (Pic Design Corp.)

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nations of point angle, lip relief angle and helix angle to solve all metal cutting needs. The range of geometric angles gives every possible drill point that is practical for drilling metal, fiber, plastics, wood and other allied materials. (Conn. Special Machine Inc.)

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Counting Scales

A complete guide describes the very latest weigh-counting scales. Included in the handy guide are heavy duty scales with a weigh-counting gross capacity of 2½ tons. At the other end of the range, scales that can count pieces as small as 1/100th of an ounce are shown. (Detecto Scales, Inc.)

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Motor Breakdown

A comprehensive eight page bulletin on fractional horsepower motors gives a description of the construction and design details. Each point is illustrated with photos and drawings, and a life size photo of a cut-away motor is shown in full color. (Reliance Electric & Engineering Co.)

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Holdback Clutch

Holdback clutches specially designed to prevent runback or reverse travel of inclined conveyors, bucket elevators, capstans, and related materials-handling or operating equipment provide the theme of a 12-page catalog. (Formsprag Co.)

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Dust Collectors

A four page bulletin describes a cline of dust collecting, recovery, and classifying equipment. Also covered are, air pollution, material handling and classification, recovery of material from waste gases. (Buell Engineering Co., Inc.)

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Packaging Guide

An illustrated brochure provides a complete guide to modern blister packaging. The folder presents a pictorial view of the rigid quality control techniques employed. (Lawrence Packaging Supply Corp.)

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Transducer Systems

A series of articles on varied applications of high accuracy transducer systems has been collected. Included in Bulletin are such diverse stories as electronic weigh loading of hot metal, and pelletized ore; electronic weight and force and thrust measuring on aircraft and missiles. (Gilmore Industries, Inc.)

For free copy circle No. 16 on postcard

Nut and Bolt Strength

A fundamental and clear explanation of the different kinds of strengths involved in metal bolts and nuts, plus the inside story of how those strengths are achieved, is now available in a new 14-page illustrated booklet. (The H. M. Harper Co.)

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Frequency Response

A research staff member has prepared a 12-page bulletin on "Fundamentals of Frequency Response." The paper is intended to provide the practical instrument man with a rudimentary knowledge of the terminology and a basic understanding of this relatively new technique in the control field. (Fisher Governor Co.)

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Aluminum Etchent

A wide selection of aluminum etch compounds which produce a variety of etched results from coarse grain to extremely fine are fully described in a five-page Bulletin. Rates of metal removal vary so that an aluminum etch compound can be selected to give any desired result, from soil removal to deep attack for chemical milling. (MacDermid, Inc.)

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Jig Borer

Jig-boring machines can be equipped with tape control in three axes, giving them full numerical depth control as well as positioning control. A 19-page bulletin gives full detail. (Fosdick Machine Tool Co.)

For free copy circle No. 20 on postcard

Rotary Compressor

Heavy-duty rotary compressors for general purpose services, including those requiring delivery of oil-free air, gas or vapor are discussed in a new 17-page Bulletin. (Fairbanks Morse & Co.)

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STEELMAKING AT JESSOP

Listen...

5...4...3...2...1...0...Lift Off!

The countdown is on.

Scientists and skilled technicians scan their instruments, alert to the least sign of malfunction.

Liquid oxygen has been piped into the fuel chamber of the gleaming Atlas ICBM poised on the launching pad. Other last-minute preparations are completed.

Tension mounts. It won't be long. Listen . . .

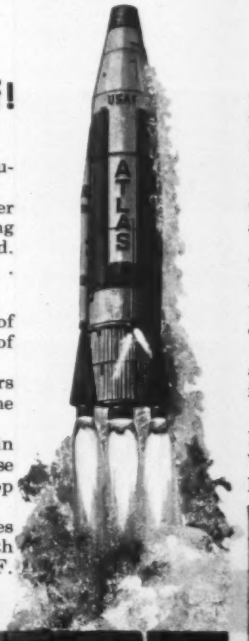
5...4...3...2...1...0...*Lift Off!*

The missile comes to life in a swirling cloud of vapor, exhaust and flame. The engine—capable of 360,000 pounds of thrust—roars thunderously.

Airborne now, the Atlas gathers speed and soars majestically on its predetermined course down the Atlantic range—a successful launching.

Jessop Steel Company makes several alloys used in the Atlas—steels forged and machined into precise but rugged mechanisms. And you will find Jessop steel in the launching pad "plumbing" too.

Swepco Tube Corporation of Clifton, N. J., makes piping for LOX systems that fuel the Atlas with liquid oxygen at temperatures of –300° F. to –320° F. *That's* punishment for any metal.



But Swepco's austenitic chromium nickel Rock-Forged pipe can take it. Ductility—to avoid fracture by reason of brittleness—is an all-important factor in this application.

With a value of about 38 foot pounds by Charpy Impact Test, the piping supplied by Swepco handles the job with ease—with an added measure of safety against costly breakdown.

Swepco buys steel from Jessop for rock-forging. Why? Because through controlled chemistry and certain production techniques, Jessop and Swepco developed a steel second to none in workability in the cold forging process.

In making steel like this, experience counts . . . and Jessop has it. Call any of Jessop's 23 sales offices in North America and let us prove it to you.

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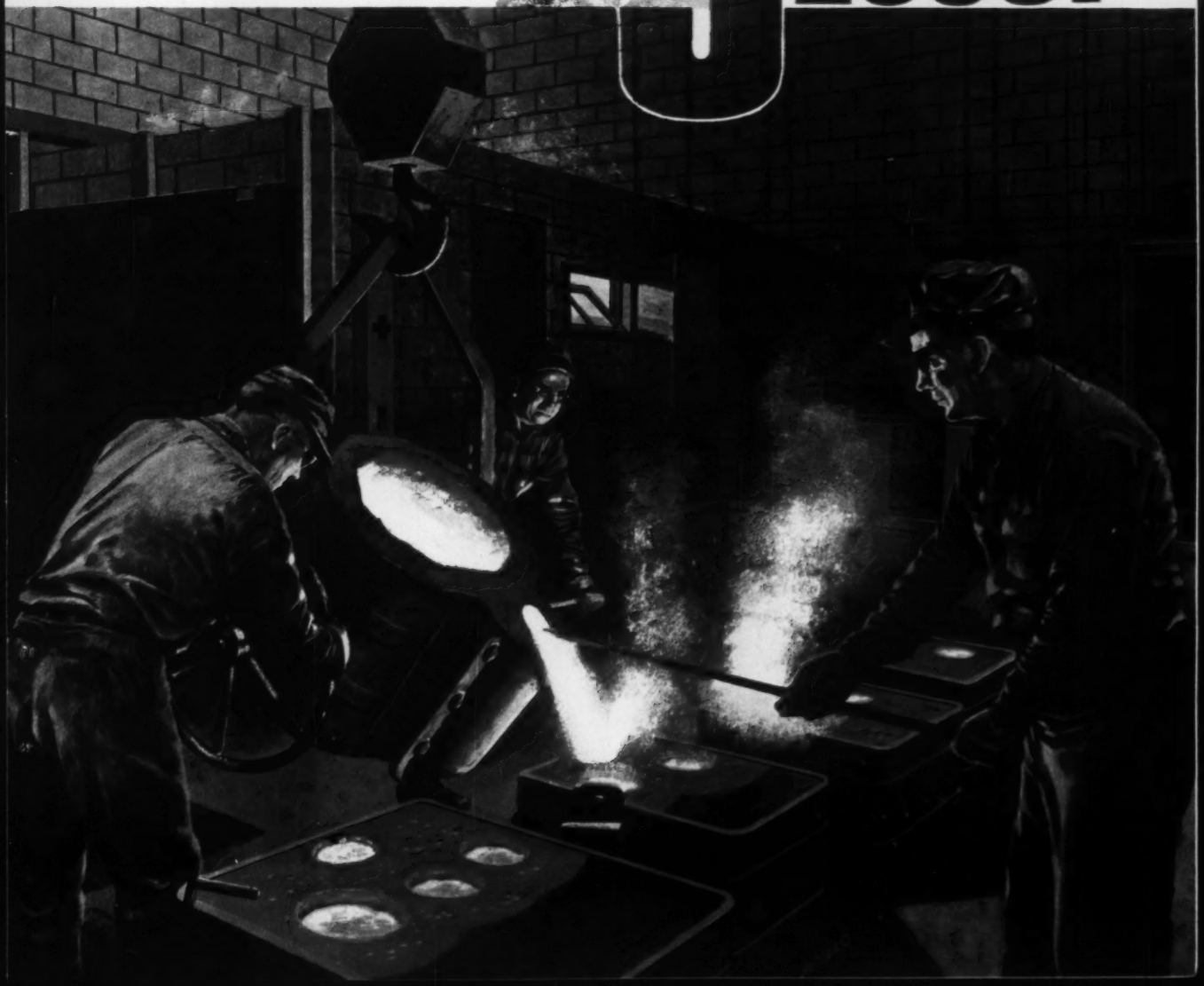
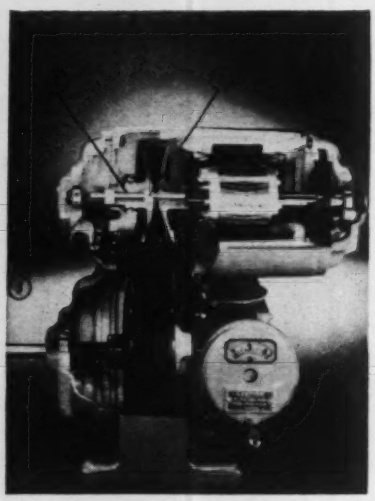


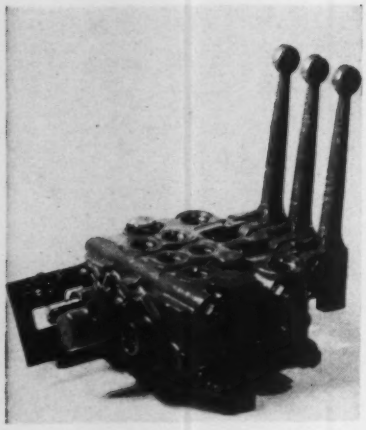
New Materials and Components



Variable Speed Drive Unit Needs No Lubrication

The development and maintenance of proper lubrication schedules are always a problem. A new variable-speed drive unit has been designed to operate without need for lubrication. Shaft surfaces are impregnated with a wear-resistant material which eliminates lubrication once on the job. The non-metallic bushings are also fabricated from a material that is equally wear resistant. First corrosion is no longer a problem since non-metallic surfaces carry the load. Bearing and belt life may also be lengthened by the elimination of worn pulleys. These often cause vibration and bearing wear. The drive units are made in ¼-25 hp, with output speeds from 4660-0.4 rpm, in speed variations up to 10:1. The new variable speed drive unit can be installed in any location, since lubrication maintenance is no longer needed. Photo shows (1) keys fabricated from tough elastic material, (2) wear-resistant bushings and (3) corrosion-proof and lubrication-(3) corrosion-proof and lub-free shaft. (Sterling Electric Motor Inc.)

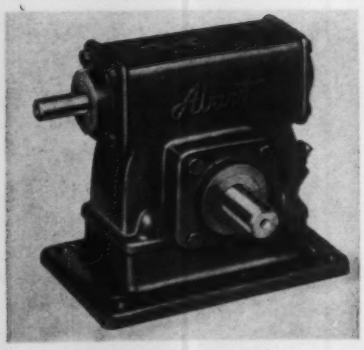
For more data circle No. 25 on postcard, p. 119



Multiple Unit Valves Have Separate Load Checks

Many new features highlight multiple unit valves. The valves are designed for use on multiple operation mobile machinery such as materials handling and construction equipment. The valves are made in any number of sections up to 10, with individual load checks in each section. They are rated for operation up to 2500 psi. Improved metering, reduced leakage from cylinder to tank, and reduced pressure drop have been achieved over older models with no increase in package size. The valves are nominally rated at 15 gpm; however, higher flow rates are possible with pressure drops acceptable to the user. A new integral pilot operated relief valve is made with pressure settings from 500-2500 psi in increments of 250 psi. An outstanding feature of this new relief valve is its extremely low pressure characteristics. (Vickers Incorporated.)

For more data circle No. 26 on postcard, p. 119



Heavy Duty Speed Reducer Handles 100:1 Ratios

Providing speed ratios from 5-4/5:1 up to 100:1, a new speed reducer handles inputs of ¼-2 hp at 1800 rpm and 1/16-1½ hp at 1200 rpm. The right-angle drive, horizontal worm gear speed reduction unit is built for continuous duty in stokers, conveyors, agitators and spraying equipment. The speed reducer is made with case-hardened and ground alloy steel integral with its shaft. Ball bearings are used throughout the unit. Oil-tight semi-steel housing contains all bearing supports to guarantee permanent alignment and eliminate split bearings. The unit's base is also semi-steel and includes a large oil reservoir. (Abart Gear & Machine Co.)

For more data circle No. 27 on postcard, p. 119

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Stainless steel piping for process installations, like the one pictured in Mogen David Wine Company's modern Chicago plant, can be readily supplied from our warehouse stock.

We maintain a large inventory of light-wall, standard, and extra-heavy stainless pipe in a variety of sizes and analyses—plus threaded and welding fittings, and valves.

Rely on C. A. Roberts Co. for prompt service and expert technical assistance on your Stainless Piping requirements.

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DESIGN DIGEST

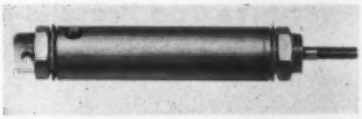
Self-Centering Rolls

Ferrous, nonferrous, and stainless steel strip can be properly tracked and aligned with the use of a self-centering roll. Each roll is engineered to the particular installation at hand. (Barclay Machine, Inc.)

For more data circle No. 29 on postcard, p. 119

Universal Mount

A compact heavy duty ⅞-in bore miniature 250-psi air, 2500-psi hydraulic cylinder is ideal for jigs, fixtures and automation equipment where speed and stamina are called for. Compactness and strength is



achieved thru fine thread screw-together construction. All parts and seals are replaceable. Cylinders stud mount front or rear, clevis mount rear, or foot mount with nuts and lock washers. (Clippard Instrument Laboratory Inc.)

For more data circle No. 30 on postcard, p. 119

Automatic Marker

A fully-automatic electrochemical marking kit, designed for build-into automatic-production lines, can save one operation. The unit does not require any redesign or modification before installation. The kit consists of a pneumatic-marking head and a cabinet which is completely piped and wired. Compressed air and electricity are both required for operation. The control cabinet is complete with marking-dwell timer, an off-cycle timer, marking intensity meter, mark depth rheostat, four-way solenoid valve, pressure regulating valve, setup switch, and indicating lights and switches for all functions. (The Electromark Corp.)

For more data circle No. 31 on postcard, p. 119

THE FREEDOM DIMENSION

. . . means alloy flexibility

Through investment casting, your metal parts can be made in a wide range of ferrous, nonferrous and super alloys. Results — better performance...longer life...lower costs!

This part for can making machinery now cast in a non-machinable alloy offers a very high degree of resistance to wear and corrosion. Results — costly parts replacement problems ended.

Better alloys often cost no more than the "inexpensive" ones when your part is an investment casting. What counts is *castability*, not machinability.

Write for complete technical and facilities information.

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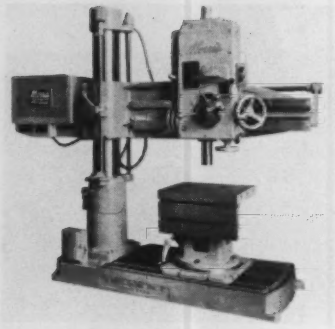
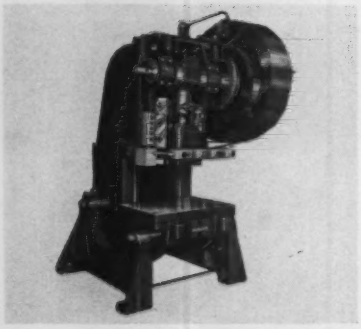
New Equipment and Machinery



Radial Drills Illuminate Workpiece, Cut Blind Spots

Providing 12 spindle speeds, 6 feeds and 12 in. spindle travel this new radial drill features completely centralized controls, fully enclosed elevating mechanism and a roller bearing mounted head. External electrical conduit has been eliminated. Column lamp control buttons are flush mounted along with a 110 v accessory receptacle. Total vision lighting assures complete illumination of the workpiece and elimination of operator blind spots. A positive displacement lubrication system provides maximum efficiency. The radial drills are made in 9 and 11 in. column sizes with a variety of arm sizes. (Morris Machine Tool Co.)

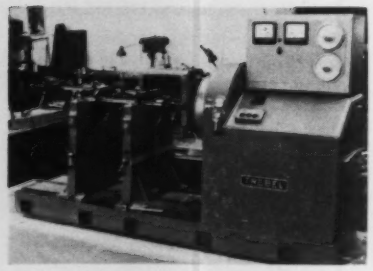
For more data circle No. 50 on postcard, p. 119



Fifty-Five Ton Press Is Versatile and Rugged

Combining fast operation and versatility, a new 55-ton power press handles both large and small sized jobs quickly. The press features an extra heavy and fast operating ram slide with long, full-vee ram to maintain precision alignment under loads. The specially designed high-tensile, cast-steel frame gives the ram extreme rigidity. It also prevents binding of dies during heavy blanking and drawing operations. Other features include an air-friction clutch and air-applied brake, designed for maintenance free life. A non-repeat single stroke safety mechanism helps to increase operator efficiency. Automatic feed is available. (Havir Mfg. Co.)

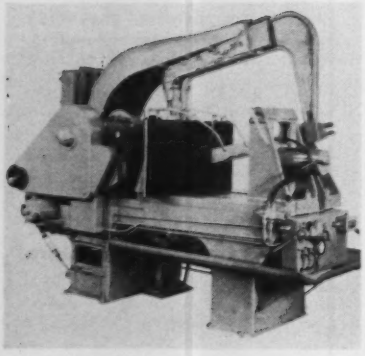
For more data circle No. 51 on postcard, p. 119



Automatic Balancer Gives Immediate Readings

A newly designed force-measuring balancing machine automatically indicates the amount of unbalance in a workpiece and the exact angular location without the need for trial calibration runs or tests weights. By supporting the work on rigid bearings, actual operating conditions of the rotating element are simulated on the balancer. The centrifugal forces which the rotating workpieces exerts due to unbalance, are measured directly by a pressure-sensitive transducer. (Kurt Orban Co., Inc.)

For more data circle No. 52 on postcard, p. 119



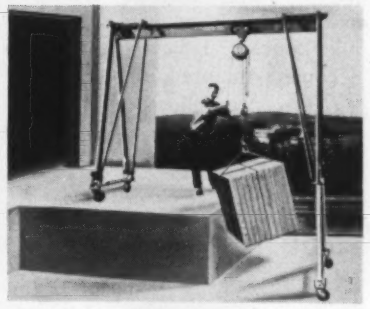
Heavy Duty Saw Handles Thick Sections

A heavy duty hydraulic saw will cut material up to 24 x 24 in. or 25 in. diam. The unit uses a 36 x 4½ in. x 0.125 x 2T saw blade to obtain maximum capacity. A 10 hp 4 speed motor and a built-in three-speed gear box provide 11 variables in speed ranging from 12-145 strokes per minute. The stroke length is 6 in. The unit has an adjustable pressure-type hydraulic feed with a range of 0-350 psi. A total downward pressure of about 42000 psi can be applied with the double main cylinder. A heavy-duty hydraulic chuck cylinder, adjustable vertically, holds the work piece. The machines total height from floor to table top is 32 in. The rating for the main drive is 10 hp. (Racing Hydraulics & Machinery, Inc.)

For more data circle No. 53 on postcard, p. 119

Versatile Gantry

An adjustable gantry can be set up on the end of loading platforms, as well as on truck beds, in pits and other cramped areas. The gantry has telescoping legs with 6 ft of height adjustment, and a self-leveling I-beam for off-center loads.



The trolley is free to travel the entire length. The pole can be lowered and narrowed when rolling through tight aisles, under fire doors and into elevators. The entire unit is weatherproofed, and folds compactly for hauling or storage. (B. E. Wallace Products Corp.)

For more data circle No. 55 on postcard, p. 119

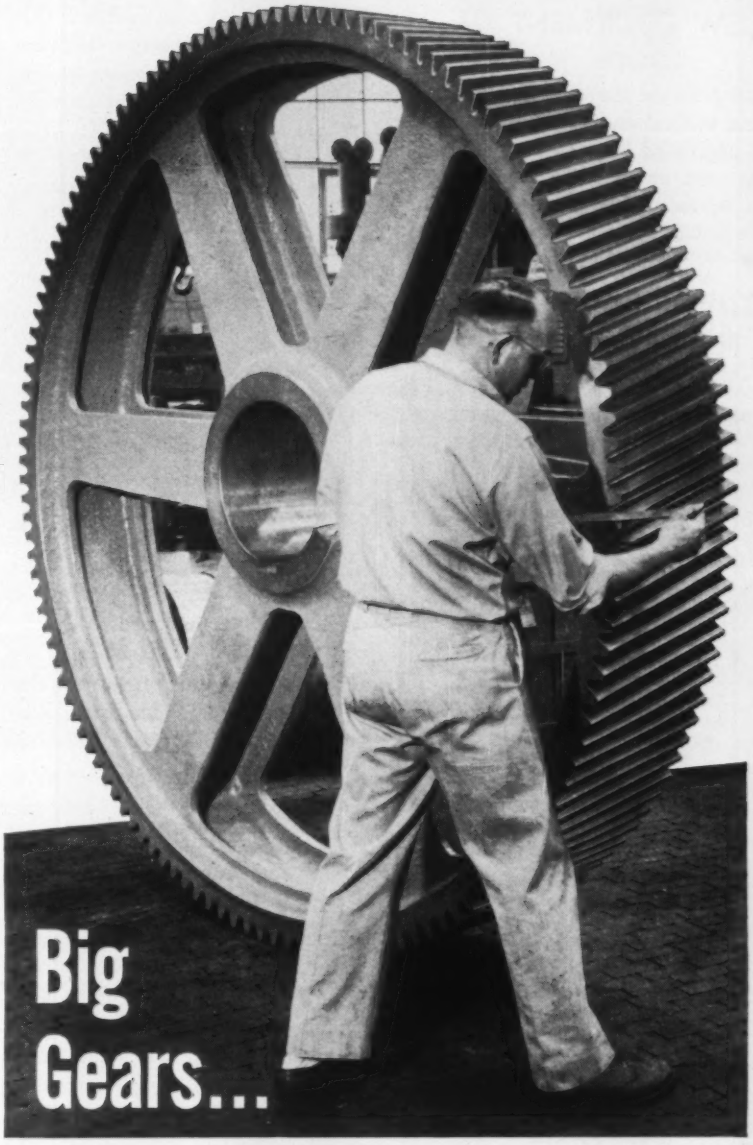
Duplex Coolant

A new coolant fills the needs of central-lub systems. It can be used interchangeably for grinding ferrous and non-ferrous metals and will not damage valves or other fittings in the system. The coolant helps to grind steel and cast iron without rust, and brass and aluminum without corrosion. Magnesium and ductile iron are the only metals with which the new coolant can not be used. The product is also non-foaming even in high-pressure, high-capacity coolant systems. (S. C. Johnson & Son, Inc.)

For more data circle No. 56 on postcard, p. 119

Marks and Stencils

Automatic stencilling and marking of metal, glass and plastic parts can be done with a compact sand blast machine. In operation, parts to be etched are placed in a work locating fixture on the top of the cabinet. Visual observation and location of the workpiece is not necessary. The sand blast nozzle is lo-



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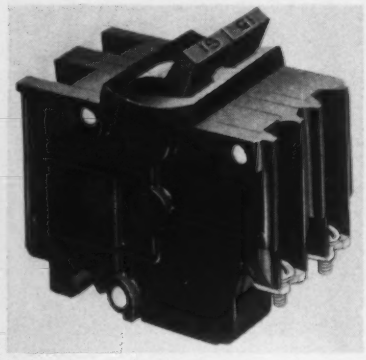
cated within the cabinet and fixed in a vertical position. Abrasive flow is controlled by a foot pedal. Stencil work up to ¼ in. round or ⅞ in. square can be handled by a single nozzle. (Pressure Blast Mfg. Co.)

For more data circle No. 57 on postcard, p. 119

Circuit Breaker

Molded case circuit breakers featuring bolted construction. This gives positive connection between the breaker and the main bus. A lighting and power circuit breaker is made in one, two, and three poles with ratings from 15-70 amp. The device is designed for the protection of electrical distribution circuits from overload and short circuit conditions. Typical applications include use in power and lighting panelboards for commercial building, industrial plants, and residential buildings. (Federal Pacific Electric Co.)



For more data circle No. 58 on postcard, p. 119

Epoxy Compound

Engineered for use on coils, small transformers, resistors, capacitors. A new epoxy transfer molding compound features low molding pressures and temperatures, good resistance to thermal shock and long shelf life. Other advantages include: Soft flow, minimizing hazard of lead wire breakage or component distortion, stable electrical properties: low water absorption; and excellent temperature stability. (Mitchell-Rand Mfg. Co.)

For more data circle No. 59 on postcard, p. 119

Strapping Unit

A semi-automatic strapping station for narrow strip coils, has its machine head mounted above a roller conveyor table and supported by counter-balanced arms. This suspension system, allows fingertip positioning strapping machine. A force of only 3½ lb on the adjusting handle positions the unit anywhere in its 21-in. vertical range and 14 in. horizontal travel. The unit will place any number of radial straps on coils as large as 60 in.-O D, 24 in.-I D, and 16 in. wide, as small as 19 in.-O D, 13 in.-I D, and ⅜ in. wide. The maximum coil weight handled is 4000 lb. (Signode Steel Strapping Co.)

For more data circle No. 60 on postcard, p. 119

Shears Then Welds

An automatic combination shear and end welder provides continuous strip for roll forming, tube manufacturing, punch press jobs and coil-strip processing lines. The new rocker-die combination unit uses the mash-seam process to join coil strip ends for continuous processing lines. A significant feature of the equipment is its fast cycle capacity. Complete operation time for clamping, shearing and welding will range from 15-25 seconds, depending

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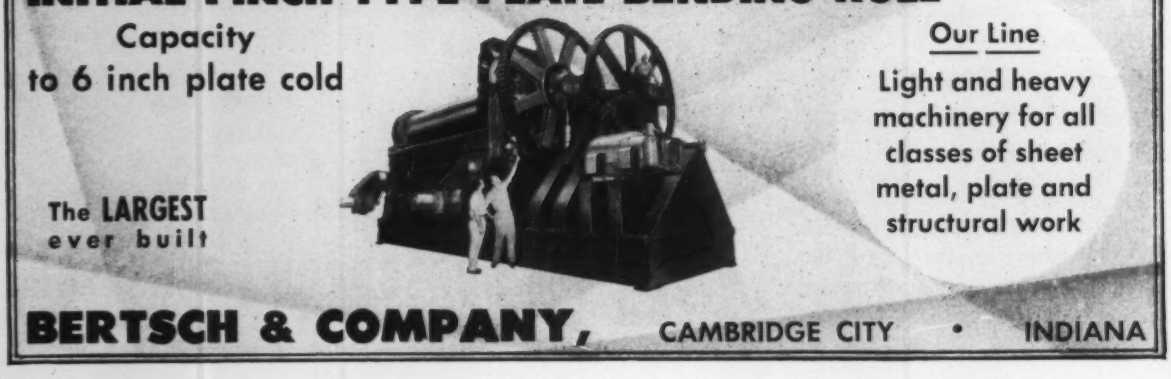
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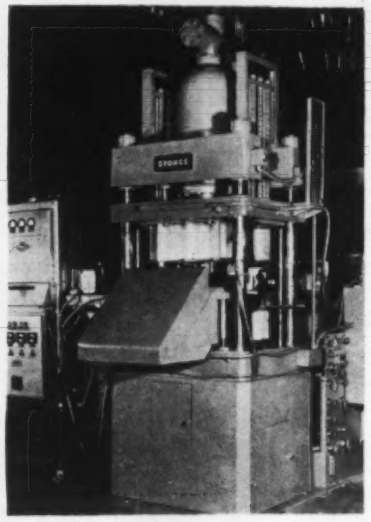
upon material thickness and width. (Guild Metal Joining Equipment Co.)

For more data circle No. 61 on postcard, p. 119

Molding Press

A 200-ton automatic transfer molding press incorporates two innovations in plastics molding equipment design and performance. First, a fully-automatic system for feeding preforms into the pre-heater, and for moving the heated charge into the molding area. Second, a combing

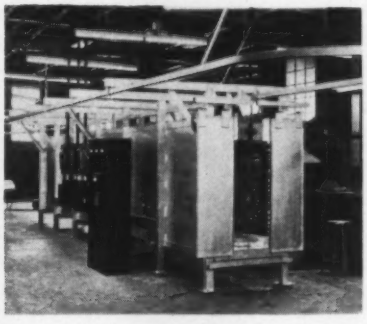


and ejection system which separates the cull and runners from the finished molded pieces. This integration of press and pre-heater makes the unit completely automatic from beginning to end of the molding operation. (F. J. Stokes Co.)

For more data circle No. 62 on postcard, p. 119

Enameling Furnace

A 30-ft continuous enameling



furnace features its own built-in overhead conveyor. The furnace allows continuous firing of sheet

MEEHANITE® MEANS BETTER CASTINGS

By W. H. MOORE
Vice President
Meehanite Metal Corp.

What you should know about Meehanite Metal

WHY THERE IS NO EQUIVALENT

How many times have you been told "I can give you something just as good as Meehanite® and at a lower price" only to find that the castings did not meet your standard of quality.

Actually there is no equivalent for Meehanite metal. Here's why: The exclusive Meehanite process makes use of 32 patented procedures that are essential to the production of highest quality castings and which can be used only by bonafide Meehanite licensees. These procedures relate to all phases of manufacture including processing agents, melting furnaces, sand control, and molding to insure the integrity exhibited by every Meehanite casting. More than 200 Meehanite foundries throughout the world prove the validity of these techniques and share in 35 years of technological know-how that truly puts Meehanite metal in a class by itself.

The production of Meehanite® involves a lengthy training period under the direction of Meehanite engineers, and a continuing program of metallurgical help and advice. Set standards of operation enable Meehanite foundry-men to apply structural control to castings on a day by day basis.

Essentially, the metallurgical control in the production of Meehanite castings involves obtaining a balance between undercooling produced in the melting operation and nucleation produced by processing the molten metal with alkaline earth agents. The initial degree of undercooling is related to the mass of the casting to be poured and the density and physical properties required. This is then modified by nucleation to force deposition of graphite at exactly the right time during solidification so as to give the right size and shape and distribution to the free graphite at the same time maintaining the character of the metallic matrix. The net result is predictable properties and uniform structure in every section of a casting and from casting to casting.

Gray cast iron made to a chemical specification without benefit of controlled undercooling is influenced by mass effect to a maximum degree and for this and other reasons cannot be considered an equivalent to Meehanite.

There are more than 26 different types of Meehanite metal available, each of which is specifically designed for a given set of service conditions.

Accept no substitute for Meehanite quality and performance. Specify Meehanite castings and be sure. For more information about Meehanite castings and the foundries making them, write to: *Meehanite Metal Corporation, 714 North Avenue, New Rochelle, New York.*

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Meehanite Castings Are Made Only By Meehanite Foundries

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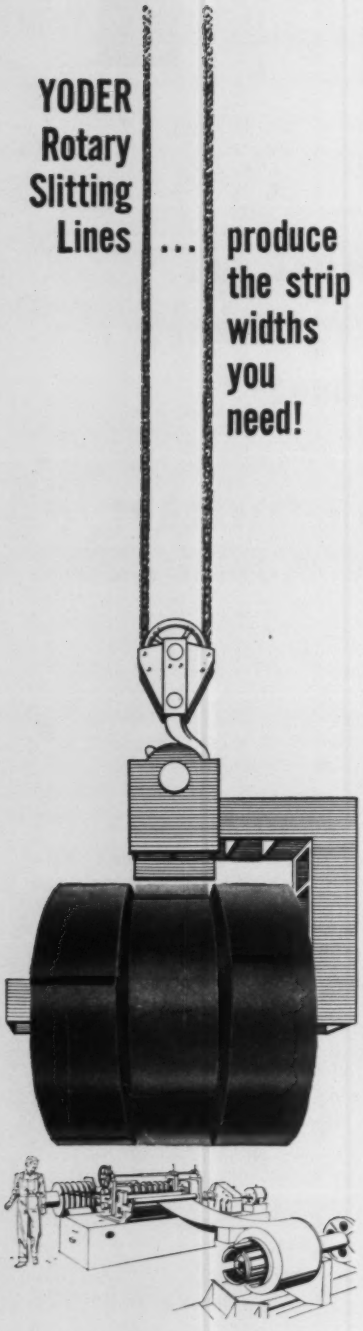

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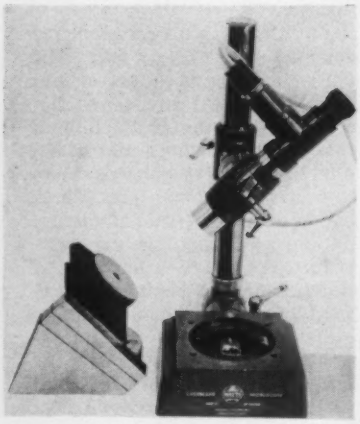
YODER ROTARY SLITTING LINES

metal panels for both the undercoat and final enamel coat. The unit is electrically heated, and is rated at 225 kw. It consists of three sections: pre-heat, firing, and a cooling section. (Waltz Furnace Co.)

For more data circle No. 63 on postcard, p. 119

Checks Tools

Applications of this instrument include the checking of machine tools and machine tool set-ups, vee blocks; fixtures, gages and toolroom equipment and angles on precision products such as plastic molds, dies and fixtures. Angular displacements in two directions are measured

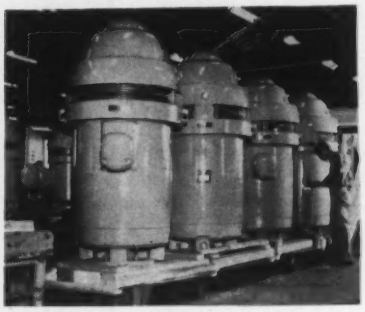


simultaneously, by comparison with a standard such as a gage block or ploygon. Readings are obtained by observing the position of a reflected crossline target in relation to a fixed scale graduated in minutes. Readings can be taken direct to 1 minute of arc and estimated easily to 30 seconds. (Engis Equipment Co.)

For more data circle No. 64 on postcard, p. 119

Hollow Shaft Motors

Designed to resist foul weather, new hollow shaft pump motors are made up to 800 hp. The motors are more than 6 ft tall, with mounting base diameters of 30½ and 24½ in. They are available in 3 or 2 phase, 60 cycles, with class A insulation 40°C. rating or class B



insulation 60°C. rating. The motors are formwound. (U. S. Electrical Motors Inc.)

For more data circle No. 65 on postcard, p. 119

Refractory Cement

New and improved formulations of refractory cements are available in heat-setting and air-setting types. They are used for bonding mullite, high alumina, kaolin, super-duty or fireclay brick and shapes in any high-temperature furnace. Properties of the new formulations include materially-improved workability in

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either dipping or trowelling consistency; excellent refractoriness with high bonding strength; superior resistance to slagging or erosion; and negligible shrinkage at high temperatures. (Chas. Taylor Sons Co.)

For more data circle No. 66 on postcard, p. 119

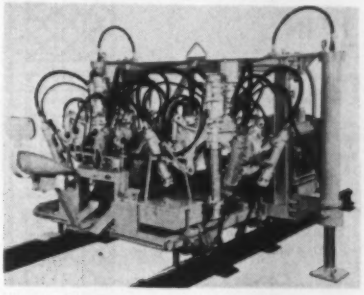
Aluminum Coating

A coating can be applied directly to uncleaned and untreated aluminum. Available in clear and a wide range of colors, it is particularly suitable for use on foil packaging, gift wrapping and containers. The coating is a high-gloss baking synthetic with exceptional adhesive properties. It forms a tough, abrasion-resistant film which will not scratch, rub off or crack. (Cosden Paint Co.)

For more data circle No. 67 on postcard, p. 119

Hydraulic Jacks

Gang tampers for rail ballasting now comes equipped with a built-in pair of large diameter hydraulic jacks for all types of raising operations. The jacks are broad-based, set



beyond the ends of ties and can lift a total net load of 25,000 lbs. (Racine Hydraulics & Machinery, Inc.)

For more data circle No. 68 on postcard, p. 119

Heavy Lathe

With 60 in. between centers, a heavy lathe features a 7-hp motor, and all-geared headstock, 3 bearing spindles and spindle control by double-multidisc clutch—combined with electromagnetic brake. Spindle speeds are from 400 to 2450 rpm. The lathe has a totally enclosed quick-change gear box, a coarse-thread attachment and a fourth bar with 5 longitudinal stops. It also makes use of automatic cross stops and a tailstock with a graduated quill. The latter is equipped with a magnifying glass. The headstock and the tailstock both contain tool trays. Automatic force-feed lubrication is provided to the headstock, apron and bed ways. (Hermes Machine Tool Co., Inc.)

For more data circle No. 69 on postcard, p. 119

Burnishing Compound

A new soap compound has been developed for burnishing stainless steel and aluminum. The new material is absolutely neutral. It is claimed that it imparts better color and luster than do ordinary compounds. (Tumb-L-Matic, Inc.)

For more data circle No. 70 on postcard, p. 119

Rust Remover

A new rust remover, improved with chemical additives, is now being tested by hundreds of manufacturers, processors and institutions

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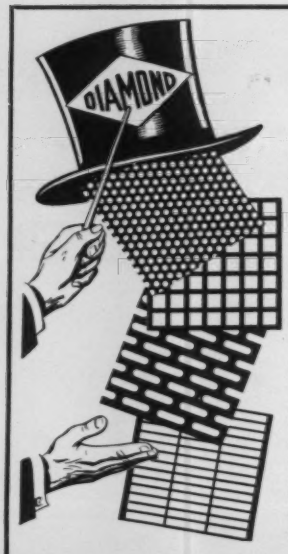
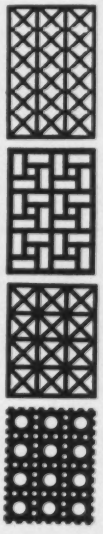
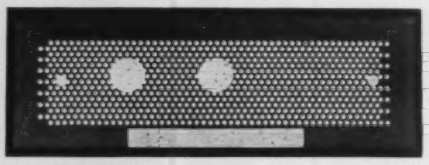


ANYTHING
IN
Perforated Metal



We're not magicians but, in nearly half a century of successful experience, have acquired such a wide range of dies, tools and other plant facilities that almost anything in the way of perforated metal sheets, plates, or parts can be produced efficiently and economically.

Our new 32-page **"Catalog 59"** illustrates a great variety of perforated metal patterns and gives complete working data. Also shows many modern industrial applications. Write for a free copy and let us quote on your requirements. When given sufficient information, our experienced engineers are often able to make money-saving suggestions—without charge or obligation.



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where rust and corrosion are a hazard. This improved chemical solution, known as Cor-O-dex, may be applied to any metal surface by brush, spray gun, cloth or immersion. It's effective on iron, steel, stainless steel, brass, bronze, copper, nickel and aluminum. (Allied Products Co.)

For more data circle No. 71 on postcard, p. 119

Drill Presses

A 17-in. drill press line features an internal depth stop. This permits stopping of the pinion at any pre-set depth within the full 5-in. spindle travel range. Attached is a depth gage. It's calibrated down to 1/16 in. and magnified 2:1 for easy reading. This depth stop eliminates quill, spindle and cutting tool deflection. "Front-of-the-machine" convenience provides a push-button control. (Walker - Turner Div., Rockwell Mfg. Co.)

For more data circle No. 72 on postcard, p. 119

PROGRESSIVE makes BIG fixtures

For many years Progressive has pointed the way to better production in American Industry with new ideas in welding equipment and fixtures.

Today Progressive's modern facilities and extensive experience offer dependable solutions to the many unusual problems confronting industry the world over.

This gigantic (24′ diameter x 70′ length) booster assembly fixture for the Saturn missile, shown above, is a good example of Progressive's tremendous facilities and abilities.

Progressive's experience can save you time and money. Our engineers will gladly discuss your requirements.

THE PROGRESSIVE WELDER & MACHINE CO. 915 Oakland, Pontiac, Mich.

Quick Improvement Unlikely

Late steel orders could boost activity slightly in the first quarter. But the gain would be small.

The present trend means it may be April before any worthwhile improvement is noted.

■ If late steel orders come in as hoped, February and March could show consecutive, but small, steps in improvement.

But the trend in orders is substantially unchanged for the two months and it may be April before there is any improvement worth noting in the steel market.

Auto cutbacks are the big threat overhanging the market. On a broad basis, auto cutbacks are roughly balanced by gains for tinplate, miscellaneous sheets, oil country seamless, and wide-flange beams.

There is no general sentiment to indicate real improvement until warmer weather. Seasonally, and historically, there is little pickup in steel business through January and February. But usually there is an improvement in March output.

Lacking Bulge—This is what worries steelmen most. New orders for March shipment should be showing up by now. But on the basis of current orders, the traditional bulge in March production is likely to be too small to change the picture.

As it stands now, the entire first quarter will show only points of improvement. April, May, and June are the critical months. Here are the points that may give the market a lift:

1. Small steel consumers should be ordering more.
2. Construction should be better as spring approaches.
3. Customer resistance in the auto market should melt with the spring thaw.
4. Seasonal effects are not entirely wiped out and should be a factor.

Economic Pattern—But, more and more, it is evident that there will be no big change in steel orders and production until the economy changes. This means, except for moderate changes in the market, no real improvement is likely before mid-year.

This is the current situation in critical automotive steel orders:

One mill with representative automotive business says it has in all orders from two automotive divisions for the rest of the 1961 model run. These divisions (from the Big Three, but not the same company) say no more full monthly orders will be placed unless something radical happens to car sales. In other words, nothing but spot orders after March.

Hold Production—Another automotive company has told steel suppliers not to put any March steel into production as yet because it could be rescheduled or cancelled. One company has cancelled 25 pct of its March buy.

On the basis of the weak market, competition between mills has reached a condition seldom experienced by steel salesmen. It has become so intense as to approach the ridiculous as consumers demand mill quotations in a matter of hours.

Hurried quotes are resulting in costly mistakes—either losing orders or making them unprofitable.

Production Data—Because of the legal holiday, American Iron & Steel Institute figures for last week were not available, below.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	—	81	83	141
Buffalo	—	71	68	144
Pittsburgh	—	69	70	145
Youngstown	—	80	73	152
Cleveland	—	75	77	169
Detroit	—	93	99	146
Chicago	—	86	86	144
Cincinnati	—	86	76	149
St. Louis	—	86	78	118
Southern	—	78	80	128
Western	—	93	90	138
U. S. Index	—	80.1	79.6	144.2

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	....	1,492	....	....
Ingot Index				
(1957-59=100)	....	80.1	....	....
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel, base (cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$33.50	$32.50	$31.50	$39.17
No. 2 bundles	$23.83	$22.83	$22.17	$25.17

Electroplating Business Off

Because they rely so heavily on prosperous conditions in other industries, electroplaters are also recession-struck.

Plating is now a buyer's market with a bonus of new products.

▪ Electroplating suppliers are hesitant to say how business is.

But, one major supplier notes, "The trend of sales of plating and plating supply industries reflects, to a marked degree, the business climate of end users such as automotive, appliance, furniture and aircraft producers."

In other words, business isn't good.

In the automotive industry, for example, platers feel somewhat frustrated. A combination of complaints by auto owners and suggestions from platers and their suppliers finally convinced automakers to use heavier plate on bumpers and trim. In some cases the plate is three times thicker than before this decision. And plating sales were on the rise.

However, the advent of the compact cars, with a minimum of trim, halted this trend.

Buyer's Market—The soft business picture, along with very sharp competition in the plating supply market, has definitely made this a buyer's market now.

Standard plating chemicals are available, in most cases, off the shelf. Delivery of metal anodes is a matter of days. One supplier says he can drill and tap, and cut nickel anodes to length, and have them on the trucks in three to five days.

Platers themselves must now make pinpoint deliveries. One plater, for example, has a man stationed full-time at a major auto plant. He tells the plater what to run even before the order comes in, based on operations and inventory at the plant.

In a situation like this, says the supplier, it sometimes takes only one broken promise to lose business that took years to develop.

Product Bonus—The buyer's market also brings a bonus in new products as suppliers maneuver for a market advantage. Metal & Thermit Corp., a major supplier of chrome plating compounds, has found a way to add fluorinated wetting agents to the compound. Simply, this propriatory product holds down the chromic acid fumes—a major occupational hazard in chrome plating.

The latest development of the Udylite Corp. is its Ultrasil. This is described as "a totally new concept in design, construction and performance of rectifiers."

Udylite Research Corp., a subsidiary, has two new products: N2E, for electroplating a coating with sulphur-free, semi-bright nickel on metal surfaces; and Satylite, a nickel-plating process which the company says produces a rich, smooth, non-reflecting nickel plate without hand polishing or buffing.

New Trends—Trends in this area include development of more automated plating equipment, faster acting chemicals, and more advanced techniques.

For electroplaters, there is no major problem from imports.

WASH AND RINSE: A workman operates an automatic plating machine with electrocleaning and rinse tanks in the foreground. Plating stations are in the background. The recession has hurt the plating industry too.

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- Glass-to-Metal Sealing Alloys
- Clad Metals and
- Composite Wires . . . Base and Precious Metals

Write for Bulletin No. 12

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Miscellaneous Users Support the Market

Automakers are pulling out of the steel market, but other users are moving in to fill the steel order void.

However, the pickup in other products is scarcely enough to off-set the lag in sheet and strip.

■ The strength of the market is moving away from automotive. Increasing support is coming from miscellaneous users. But the changes are not felt uniformly—neither by products nor districts. Nor are the tonnages always sufficient to offset automotive losses.

Mills with a product mix geared to the automotive industry are suffering from additional cutbacks. Other mills, which have experienced greater market depression, are beginning to see some pickup.

Making gains—Tinplate, galvanized and aluminized flat-rolled products are making some gains. But in the case of tinplate, for example, the gains are still less than seasonal.

In some areas, heavy steels are beginning to improve. While the pattern is still spotty, it now looks as though structural and plate products are being counted on for relatively good orders before too long.

Users' stocks of pipe and tubing are probably nearing the absolute bottom, and some replacement buying has been noted. While this is still following an on-again, off-again pattern, the on-again part of the cycle is showing up a little more frequently. And spring is expected to bring additional buying strength.

Sheet and Strip—It could be an early summer for mills specializing in automotive sheet and strip. Two separate automakers have said their March orders mark the end of full-month buying as far as they are concerned. From now on, it will be spot buys to fill holes in inventories, according to the report from **Detroit.** Automotive cutbacks around **Pittsburgh** are being softened by gains from other markets. Smaller users are placing more orders, but the total tonnage is still comparatively small. **Cleveland** steel mills are getting more orders from the appliance industry than they have in recent months. There's still a tendency for manufacturers to rely on fast delivery; and it's up to the mills to deliver on time or lose future orders.

Galvanized and Tinplate — Demand for coated steel products continues to hold at fair levels with additional strength beginning to show. The pickup in tinplate has begun for **Pittsburgh** mills. However, the gains are still smaller than is normal for this time of the year. The outlook for galvanized is one of continued improvement. The Committee of Galvanized Sheet Producers predicts shipments of galvanized sheets should rise to new all-time record of 3.2 million net tons this year. Shipments for 1960 were estimated to be in excess of 3 million tons, surpassing the record of 2,958,000 tons set in 1956. The Committee says the average 1961 compact car uses more than 100 lb of galvanized steel sheets. The average car in 1954 had less than 9 lb of galvanized sheets. In addition, there is a sharp trend toward increased use of galvanized steel sheets in air conditioners and home refrigerators.

Structural and Plate—A pickup in orders for wide-flange beams over the past two weeks is giving a lift to structural mills. But according to a **Pittsburgh** mill, the gain doesn't reflect any extension of commitments. Customers are still ordering on a short-term basis. But they are increasing their volume. In order to land a plate order, an **East Coast** mill has taken on a pretty big fabrication job involving missile bases for the government. Normally, the mill doesn't handle fabrication on such a large scale; it's the type of project usually landed by **Midwest** fabricators. Railroad car builders and tank fabricators around **Chicago** are coming into the market.

Pipe and Tubing—Oil country seamless orders continue to climb, according to a **Pittsburgh** mill. But they are still well below a normal level, even for the present low drilling rate. Mills expect inventory liquidation will be about ended by the start of the second quarter and normal ordering should resume then. However, there are still no advance commitments from the oil producers. Standard pipe has leveled off after last month's spurt in buying by jobbers. **Cleveland** pipe producers says jobbers are starting to stock up for the residential construction season. However, delivery is coming from stock.

Bars—Following the pattern of automotive sheet and strip orders, bar mills are feeling the effects of order cancellations and setbacks. However, there has been an improvement in the number of orders received from non-automotive sources.

PURCHASING AGENT'S CHECKLIST

Military buying policies come under attack. P. 73

Metalmakers help customers in locating new plants. P. 78

Stronger enforcement of present tax laws may mean industry will take closer look at depreciation allowance. P. 80

COMPARISON OF PRICES

(Effective February 13, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Feb. 13 1961	Feb. 6 1961	Jan. 16 1961	Feb. 16 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slags, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Feb. 13 1961	Feb. 6 1961	Jan. 16 1961	Feb. 16 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$31.50	$31.50	$29.50	$40.50
No. 1 steel, Phila. area	38.50*	35.50	35.50	39.50
No. 1 steel, Chicago	30.50	30.50	29.50	37.50
No. 1 bundles, Detroit	28.50*	26.50	26.50	37.50
Low phos., Youngstown	34.50	34.50	34.50	45.50
No. 1 mach'y cast, Pittsburgh	44.50	44.50	44.50	55.50
No. 1 mach'y cast, Phila.	48.50	48.50	48.50	52.50
No. 1 mach'y cast, Chicago	46.50	46.50	44.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.50*	$32.50	$31.50	$39.17
No. 2 bundles	23.83*	22.83	22.17	25.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	30.00	33.00
Copper, Lake, Conn.	29.00	29.00	30.00	33.00
Tin, Straits, N. Y.	100.50†	100.50	100.375	101.875
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*Appears in the Feb. 9-Feb. 23 issues.

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- TUNGSTEN
- COBALT
- NON-METALLICS
- SOLID CHEMICALS

SCREENING AND PARTICLE SIZE CLASSIFICATION

OPEN TIME AVAILABLE

MICRO METALS CORPORATION
99 President St. Passaic, N. J.
Dept. 2A
Member Metal Powder Ind. Fed.

Domestic, Export In Price Battle

In the face of good export demand, domestic interest in several areas meant increased prices.

Philadelphia's No. 1 dealer grades led the move this week.

■ Domestic buying in strong export areas brought prices up this week. Philadelphia prices for No. 1 dealer grades led the advances with increases of $2 to $3 per ton.

Scrapmen in Philadelphia, however, doubt that export prices will rise significantly. The only bearing on the market: Export supply will come from dealers within a close proximity to the docks. But export demand also forced prices up in Detroit.

Overall, prices are starting a slow but steady climb. The IRON AGE composite price for No. 1 heavy melting in January, 1960 was $41.83. The composite for the same grade last month was $31.50. However, the 1960 pattern was one of steady decline to November's low of $28.33. The trend should reverse this year with increased export demand as the strongest feature of the market.

No. 2 heavy melting price in Hamilton, Ont. is being dropped by The IRON AGE because of insufficient activity in that area for the grade.

Pittsburgh — Continued price strength was shown by the latest railroad list. Railroad specialties and No. 1 railroad heavy melting were up $1 to $2 on one large offering. However, the main effect of gains was to widen the gap between local prices and those for export and other districts. No tonnage has been pulled out of the area by export yet, but the price spread has reached a point where this is theoretically possible. The threat has brought no reaction from consumers.

Chicago—New purchases by local mills seeking to peg the explosive factory bundle market have pushed this market back slightly. But the sharp gap between what local mills are offering and what exporters will pay is widening. The export pressure in railroad grades is also growing. Roads with access to ports are already beating local prices by $3 and expect advances on the new railroad lists.

Philadelphia—Several area mills entered the market late last week resulting in an increase of $3 per ton for No. 1 dealer grades. Most scrapmen here agree that yard inventories are low because of the inclement weather and higher prices had to be paid to compete with export demand. However, there will probably be no real increase in export prices. This means shipments to the docks will have to come from scrapmen in Philadelphia proper who have the advantage of low freight costs.

New York—This market is just now starting to dig out after the recent snows. Scrap intake is still off, but it should be back to normal by the end of the week. Exporters know this is a temporary situation and successfully continue to resist higher prices.

Detroit—Export interest is sending prices of No. 1 grades up. Perhaps two-thirds of February's No. 1 industrial bundles and a large percentage of No. 1 dealer bundles are going to exporters. Almost all No. 1 heavy melting is going abroad. Japanese seem particularly interested in Detroit's No. 1 heavy melting because of possible second quarter shortages on the West and Gulf Coasts.

Cleveland—Only small tonnages are moving at present price levels although dealers generally continue to remain optimistic. Any major orders would probably require higher prices. Only limited amounts of top grade material remains in dealer yards.

Cincinnati—Upriver markets are drawing off scrap as local mills show little interest. Some distress tonnage of steel and foundry scrap is coming in from upstate areas. Layoffs are also cutting into scrap generation.

St. Louis—A strong undertone prevails here. However, mills continue to resist higher prices. They maintain that they do not need scrap and will not pay more for the little they purchase.

Birmingham — A Birmingham electric furnace bought about half of its usual monthly tonnage this week at unchanged prices. Otherwise, scrap movement in the district is almost at a standstill.

Buffalo—There is no sign as to when area mills will start buying again. The market is dead and prices remain unchanged.

Boston — Activity is up both domestically and for export. With the increasing demand come several slightly higher prices.

West Coast — Mills continue token buying only. Exporting still grabs most of the area scrap. In Los Angeles, No. 1 cupola cast is in very short supply.

Houston—The district mill came into the market for some selected purchases, including high-quality No. 2 melting steel. Emphasis continues, however, on exports.

SCRAP PRICES *(Effective February 13, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	37.00 to 38.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth	43.00 to 44.00
Rails, 2 ft and under	47.00 to 48.00
RR specialties	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	35.00 to 37.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs plate, ¼ in. and heavier	37.00 to 38.00
Low phos. 2 ft. and under	35.00 to 36.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth	43.00 to 44.00
Rerolling rails	55.00 to 57.00
Rails 2 ft. and under	47.00 to 48.00
Angles and splice bars	41.00 to 42.00
RR steel car axles	56.00 to 57.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	46.00 to 47.00
Cupola cast.	41.00 to 42.00
Cast iron wheel	32.00 to 33.00
Malleable	44.00 to 45.00
Stove plate	35.00 to 36.00
Steel car wheels	39.00 to 40.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	90.00 to 95.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 2 ft punch'gs	42.00 to 43.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	25.00 to 26.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	50.00 to 52.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	41.00 to 42.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	27.50 to 28.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	36.00 to 37.00
Rails, random length	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast.	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Drop broken cast.	46.00 to 47.00

Youngstown

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	32.50 to 33.50
No. 2 bundles	20.00 to 21.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Low phos. plate	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	29.00 to 30.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut structural & plates, 2 ft & under	35.00 to 36.00
Low phos. punch'gs plate	30.00 to 31.00
Drop forge flashings	29.00 to 30.00
Foundry steel, 2 ft. & under	31.00 to 32.00
No. 1 RR hvy. melting	32.00 to 33.00
Rails 2 ft. and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	23.00 to 24.00
Railroad cast.	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	39.00 to 40.00
Malleable	44.00 to 45.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	80.00 to 90.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	25.00 to 26.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	13.00 to 14.00
Low phos. plate	33.00 to 34.00
Structurals and plate, 2 ft. and under	35.00 to 36.00
Scrap rails, random lgth	34.00 to 35.00
Rails 2 ft. and under	44.00 to 45.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	36.00 to 37.00

St. Louis

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
Foundry steel, 2 ft.	28.00 to 29.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	18.00 to 19.00
No. 1RR hvy. melting	32.00 to 33.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
RR specialties	39.00 to 40.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	36.00 to 37.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	49.00 to 50.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	34.00 to 35.00
Elec. furnace, 3 ft. & under	34.00 to 35.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft.	37.00 to 38.00
No. 1 RR hvy. melting	32.00 to 33.00
Scrap rail, random lgth	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	36.00 to 37.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	20.00 to 21.00
No. 2 dealer bundles	15.00 to 16.00
Machine shop turnings	2.00 to 3.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	22.00 to 23.00
Drop forge flashings	22.00 to 23.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Heavy breakable cast.	25.00 to 26.00
Mixed cupola cast.	30.00 to 31.00
Automotive cast.	36.00 to 37.00
Stainless	
18-8 bundles and solids	145.00 to 150.00
18-8 turnings	45.00 to 50.00
430 bundles and solids	50.00 to 55.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.50 to $26.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	2.50 to 3.50
Shoveling turnings	5.50 to 6.00
Clean cast. chem. borings	13.50 to 14.50
No. 1 machinery cast.	37.00 to 38.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	26.50 to 27.50

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	18.00
Machine shop turn.	14.00
Cast iron borings	14.00
No. 1 cupola cast.	46.00 to 48.00

Los Angeles

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	17.00
Machine shop turn.	12.00
Shoveling turnings	13.00
Cast iron borings	13.00
Elec. furnace 1 ft. and under (foundry)	42.00
No. 1 cupola cast.	43.00 to 44.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 2 bundles	21.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.50
No. 1 dealer bundles	28.50
No. 2 bundles	18.00
Mixed steel scrap	20.00
Bush., new fact., prep'd	28.50
Bush., new fact., unprep'd	22.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	21.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$43.00 to 44.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00

Tin Shortage Is A Possibility

Tin supply and demand hinges on a complex of world conditions.

A shortage this year is a possibility, not a probability.

■ Although tinplate hasn't shown any great strength, a seasonal pickup is on the way.

This prospect of an increase in demand for tin has prompted annual speculation of a tin shortage. A spot check of world tin authorities and traders shows divided opinion on this question.

On the no-shortage side, a New York tin trader concedes the possibility, but says it is very unlikely. For one thing tinplate makers are in fair inventory position.

Price Is Stable—He notes that $1 per lb seems to be the price ceiling. The New York price has been close to this level, for future tin, for some months now. This source notes fair buying right up to within ⅛¢ of this level. But at $1 or more, demand seems to vanish.

A tin producer says that, statistically, tin is in very sound position. Nevertheless, he says that there is more likely to be a shortage than an overage. But it would take combined booms in Western Europe and the U. S., and trouble in other major producing countries, to cause any real strain.

How It Works—Working against chances of shortage are stocks held by the International Tin Council, the world organization dedicated to stabilizing tin markets, and prices. ITC has accumulated about 10,000 tons in maintaining world prices, and would put this on the market in a hurry if shortage started driving prices too high.

Also, Malaya, world's largest producer, is understood to have large stocks of metal accumulated when exports were restricted by ITC.

Those who say shortage is a distinct possibility point to a U. S. Bureau of Mines report. It says that while tin consumption in the U. S. increased about 5 pct in 1960, total tin stocks in the U. S. declined about 15 pct in the same period. This could mean consumer inventories must be near rock bottom.

World Demand Shifts—They also point to the shift in world consumption trends and its effects. Up until 1957, the U. S. has consistently used more tin than Western Europe. That year the pattern reversed. Producers are now more sensitive to European markets, some in the trade say. So any shortage would likely to felt here.

The U. S. government has giant stockpiles of tin. Some sources say it equals two years world output. But legislation is required to release any of this metal. This takes time.

Behind the shortage talk are two major problems. First, in order to stabilize the market, the ITC must match supply to demand. This means it must guess at the market. Some believe the ITC estimated wrong in the recent past, when producers' export was restricted, and that it's too late now to take real remedial steps. And, they say this problem is going to crop up again.

Supply Problems — The other major problem is that the world's second, third and fourth largest producers are question marks.

Indonesia, second only to Malaya as a tin producer, has apparently had some confusion in administering tin mines in the last six months or so. There apparently is a shortage of technicians. One source says, "We know there is more tin in Indonesia. But they haven't done any exploration lately, so we don't know how much, how rich the ore is, or where it is."

Tin in Bolivia, world's third largest producer, has become a political issue. Bolivia mined the richest pockets of ore during World War II. Now all it has left is low grade material.

Tin operations there are losing money. Russia has offered to build Bolivia a $10 million tin smelter, and supply technicians. But Bolivian ores are so lean that they can not be smelted by themselves economically.

Metal is apparently moving now from the Congo to Free World markets. But no one is betting on the future.

Tin prices for the week: Feb. 7 —100.50; Feb. 8—100.50; Feb. 9 —100.375; Feb. 10 — 100.625; Feb. 13—100.625*.

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	29.00	30.00	1/16/61
Copper (CS)	29.00	30.00	1/11/61
Copper (L)	29.00	30.00	1/16/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. **Other primary prices, pg. 139.**

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/8
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	55.32
Brass, Yellow	48.10	48.39	48.04	52.26
Brass, Low	50.65	50.94	50.59	54.71
Brass, Red	51.54	51.83	51.48	55.60
Brass, Naval	52.86	59.17	46.67	57.02
Munts Metal	50.94	.....	46.25	.....
Comm. Bz.	52.98	53.27	52.92	56.79
Mang. Bz.	56.80	.....	50.20	.....
Phos. Bz. 5%	74.59	74.34	75.09	76.52

Free Cutting Brass Rod 33.71

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb)...$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 27.25
- No. 120 ..... 26.25
- No. 123 ..... 25.25

80-10-10 ingot
- No. 305 ..... 31.75
- No. 315 ..... 29.50

88-10-2 ingot
- No. 210 ..... 39.50
- No. 215 ..... 36.25
- No. 245 ..... 31.50

Yellow ingot
- No. 405 ..... 22.75

Manganese bronze
- No. 421 ..... 26.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type)..26.00-27.00
No. 12 alum. (No. 2 grade)...22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)...24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 23.75-24.75
- Grade 2—92-95% 22.50-23.50
- Grade 3—90-92% 21.50-22.50
- Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19¼	17⅝
Red brass	22¼	21½
Comm. bronze	23	22¼
Mang. bronze	18½	17⅝
Free cutting rod ends.	18⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 25
- No. 2 copper wire 23
- Light copper 20¾
- *Refining brass 21¼
- Copper bearing material 20½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 24½
- No. 2 copper wire 23
- Light copper 20½
- No. 1 composition 20
- No. 1 comp. turnings 19
- Hvy. yellow brass solids 15
- Brass pipe 14
- Radiators 16

Aluminum

- Mixed old cast. ..... 12 —12½
- Mixed new clips ..... 13¾—14¼
- Mixed turnings, dry ..... 12¾—13¼

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 21½—22
- No. 2 copper wire ..... 19½—20
- Light copper ..... 17½—18
- Auto radiators (unsweated).. 12¼—12¾
- No. 1 composition ..... 16¼—16¾
- No. 1 composition turnings... 15¼—15¾
- Cocks and faucets ..... 12¾—13¼
- Clean heavy yellow brass ... 12¼—12¾
- Brass pipe ..... 13¼—13¾
- New soft brass clippings .... 13¼—13¾
- No. 1 brass rod turnings .... 13¼—13¾

Aluminum

- Alum. pistons and struts .... 6½— 7
- Aluminum crankcase ..... 8½— 9
- 1100 (Ss) aluminum clippings 11½—12
- Old sheet and utensils ..... 8½— 9
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 9 — 9½
- 2020 (24s) clippings ..... 10 —10½

Zinc

- New zinc clippings ..... 5½— 5¾
- Old zinc ..... 2¾— 3
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1 — 1¼

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 23-23.50
- Clean Monel turnings 16.50-17
- Old sheet Monel 22-23
- Nickel silver clippings, mixed. 18
- Nickel silver turnings, mixed. 15

Lead

- Soft scrap lead ..... 7 — 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 73 —75
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 41 —42
- Mixed common babbitt ..... 9 — 9½
- Solder joints ..... 12½—13
- Small foundry type ..... 8½— 9
- Monotype ..... 8¾— 9¼
- Lino. and stereotype ..... 8 — 8¼
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2 — 2½

(Effective Feb. 13, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *Sh, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh Midland Butler Aliquippa N. Castle McKeesport Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

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STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.20 *U1*	$6.35 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*	Holloware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	$6.35 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Feb. 13, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375*P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Feb. 13, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	10.28	8.44	9.13	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.69	23.89	21.04
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		10.90	12.53	13.27	13.07	10.74	11.24	10.88	12.97	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.90	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.59	11.42	10.95	11.76	9.43	9.93	9.57	11.77	17.17	15.87	21.87	21.12
Los Angeles		9.50[1]	11.20	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	.....	10.79	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.95	10.10	10.99	10.45	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	11.45	9.60	10.05	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.15
Spokane	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	8.94	9.84	10.99	11.16	8.83	9.33	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅜" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. 1 Deduct for country delivery. 2 15 ga. & heavier; 3 14 ga. & lighter. 4 10 ga. x 48 — 120.

(Effective Feb. 13, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50–32.75	32.00	29.50–34.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Discount Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Feb. 13, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	....	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184–1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	156	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

HOW LONG SINCE YOU CHECKED ON PERFORATIONS?

No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

Our modern tool and machine shop is constantly making new dies to add to the tremendous variety of screens available. If you have a special problem we'll gladly supply design and metallurgical assistance.

No job is too small for our careful, personal attention . . . or too large for prompt delivery. Mundt's 90 years' experience is at your disposal.

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered. 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Feb. 13, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe,

f.o.b. Suspension Bridge, N. Y. per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in.

x D, del'd per lb con't Cb
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-

lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-

26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed

per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb.

contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20%

Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5

per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50%

to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%,

Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50%

max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O.,

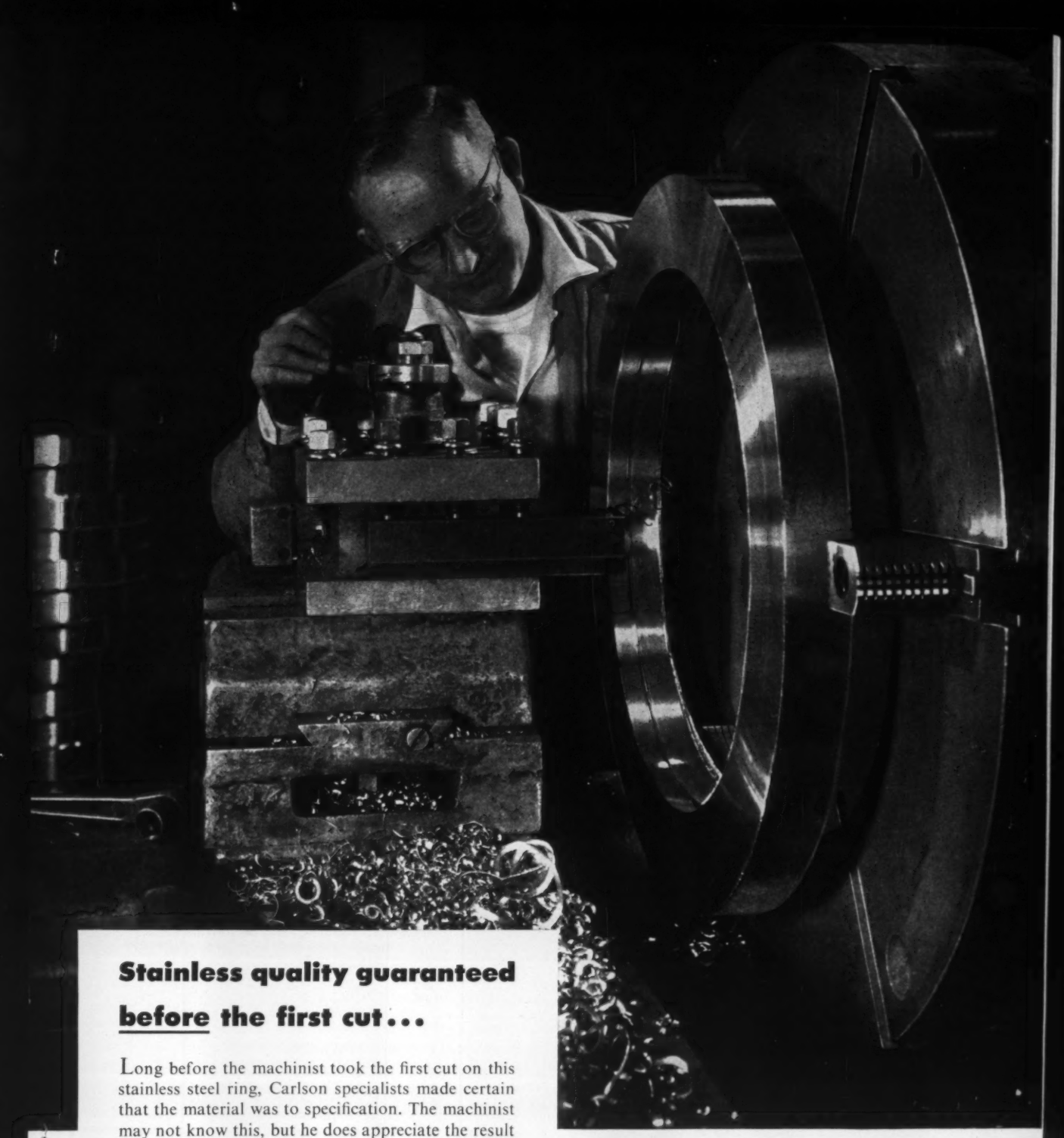
freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn,

17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00%

max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15



Stainless quality guaranteed **before** the first cut...

Long before the machinist took the first cut on this stainless steel ring, Carlson specialists made certain that the material was to specification. The machinist may not know this, but he does appreciate the result —the ease of machining to meet the most exacting requirements.

Whether you want rectangular stainless plates, pattern-cut special shapes, or machined products, you will save fabricating time by making full use of Carlson services. Fabricators of chemical, process, nuclear, aircraft and missile equipment recognize the advantages of these services.

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RE-NU-BILT GUARANTEED

M-G SETS 3PH-60 CY.

Qu.	KW	Make	RPM	DC Volts	DC Volts
2	4800(3U)	GE	450	300	2300/4600
1	2400	GE	450	300	2300/4600
1	2000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	260	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160
1	350	GE	900	125	440/2300/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2300
1	200	El. Mhy.	1200	250	2300/4600
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	KW	Make	Type	Volts	RPM
1	3900(New)	GE	Enc. S.V.	475	320
1	3000(New)	Whse.	Enc. F.V.	525	600
3	2700	GE	Enc. S.V.	415	280
1	2250(New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
2	2000	GE	Enc. S.V.	350	230/350
3	1750	GE	Enc. S.V.	250	175/350
3	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
2	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	275/550
5	400	GM	D-8	250	300/900

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Business Picks Up In Cleveland

Used machinery dealers in the Cleveland area say business has started to pick up.

Many companies are modernizing with limited budgets and are shopping for used machinery. Also, a government program could boost sales.

■ Used machinery sales in the Cleveland area have started to show signs of a pickup as plants enter modernization programs on restricted budgets. Also, a proposed government program of rebuilding used tools and shipping them to underdeveloped nations may give the industry a boost.

"In the last month we have noticed that business is starting to come back from the low point last year," says T. R. Wigglesworth, a large dealer in Cleveland's suburbs.

"We have a heavy volume of active inquiries from companies that are shopping around. In many cases the capital funds have just not been liberated or have been reduced. So the shop engineers are in the market for a good piece of used machinery. Many are finding for the first time that it's possible to pick up some real bargains."

Unsoftened Prices — Used machinery prices have not softened too much lately. But actually, prices have been in a depressed state so long now that they can't really go much lower.

In the Cleveland area, a good five-year-old machine will bring about two-thirds the price of a new one. And a machine built in the late 1940's will sell for about half the price of the latest model.

Another strong market factor is that government surplus machines have dropped off in volume. However, this situation is subject to change. Government is presently consolidating many of its warehouses and will dispose of many stored machines. The remainder, however, is specialized machinery and weak in demand.

Well Stocked—Dealer stocks are generally in "very good shape," according to Mr. Wigglesworth. This is especially true of prime machines.

"Not too many more are coming out for awhile either because most plants have not done all the housecleaning and liquidating they're going to do. A few, however, are coming in from plants which don't want to keep up their lease or can't afford to."

Obsolete Tools — The government-sponsored program, currently under consideration in Washington, would mean the rebuilding of machines which are obsolete by U. S. standards. The machines would be shipped abroad.

This would include mostly general purpose types and would probably replace hand labor in many underdeveloped areas of the world. With this machinery, of course, would go instructors and training programs so that new owners will be able to realize the full capabilities of the used machines.

The Cleveland pattern is similar to the overall national pattern: Weak sales during the fourth quarter; new interest now.

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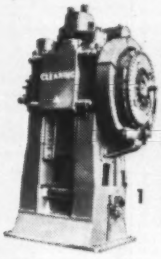
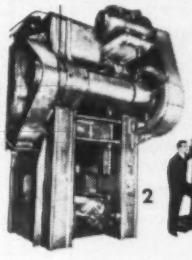


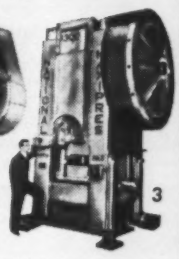
1

1600 Ton CLEARING
1952
Selling Price **$90,000**
New Price $200,000 (approx.)
Mdl. EF-1-1600, Bed 42"x46", 12" Stroke, 65 Str. pr. min.



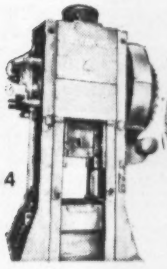
2

1600 Ton BLISS
1952
Selling Price **$90,000**
New Price $200,000
Mdl. F5-1-1600, Bed 38"x46", 12" Stroke, 70 Str. pr. min.



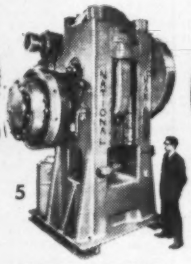
3

1300 Ton NATIONAL
1955
Selling Price **$49,500**
New Price $132,000
No. 1300 Maxipres, 10" Stroke, 80 Str. pr. min.



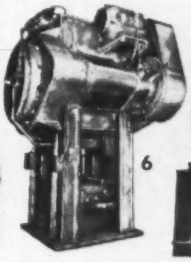
4

750 Ton CLEARING
1952
Selling Price **$36,500**
New Price $75,000
Mdl. EF-1-750-27½, 8" Stroke, 80 Str. pr. min.



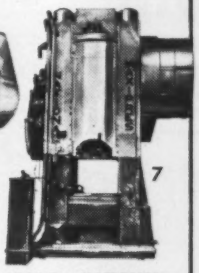
5

750 Ton NATIONAL
1943
Selling Price **$25,000**
New Price $70,000
No. 3 Maxipres, 10" Stroke, 50 Str. pr. min.



6

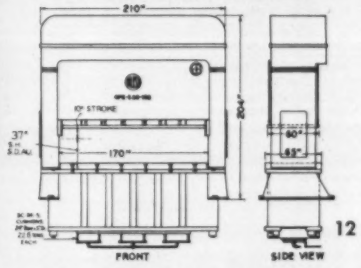
750 Ton BLISS
1952
Selling Price **$36,500**
New Price $75,000
Mdl. F-S1-750, Bed 26"x34", 6" Stroke, 85 Str. pr. min.



7

1200 Ton NATIONAL
1943
Selling Price **$49,500**
New Price $132,000
No. 4 Maxipres, 8" Stroke, 80 Str. pr. min.

WIDE BED PRESSES

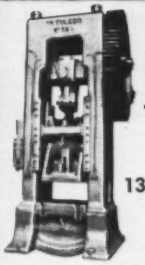


12

380 Ton BLISS
Bed Area: 170" x 65"
Selling Price **$35,000**
New Price $95,000

3 Presses available. Cushions extra. Mdl. 4FE-380-168, 10" Str., 18 Str. pr. min. For Blanking, Drawing, Forming and Progressive Die Operations.

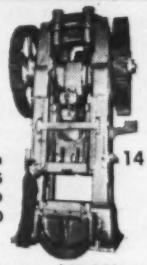
SINGLE CRANK PRESSES



13

440 Ton BLISS TOLEDO No. 59¼

Selling Price **$12,500**
New Price $50,000
Bed 41"LR x 48"FB, 12" Str., 29" S.H. Air Clutch, Air Cushion.

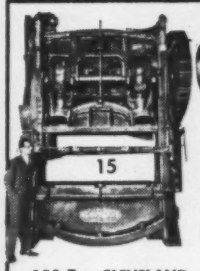


14

920 Ton BLISS TOLEDO No. 60

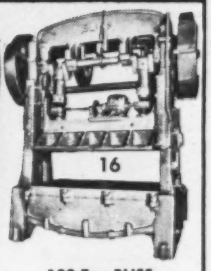
Selling Price **$25,000**
New Price $110,000
Bed 46"LR x 72"FB, 20" Str., 36" S.H. Air Clutch, 14 SPM. For Blanking, Trimming, Coining, Impact Extruding, Drawing.

DOUBLE CRANK PRESSES



15

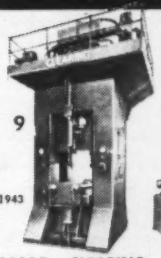
150 Ton CLEVELAND
60-D-84
Selling Price **$8,500**
Replacement Cost $40,000
Bed 86"LR x 46"FB, 14" Str., 31" S.H. 33 SPM. Air actuated friction clutch. For Blanking, Drawing, Forming, Die Tryout.



16

100 Ton BLISS
Consolidated No. 166D
Selling Price **$7,500**
Replacement Cost $40,000
Bed 84"LR x 48"FB, 12" Str., 30" S.H., 17 SPM. Air Clutch. For Blanking, Drawing, Die Tryout.

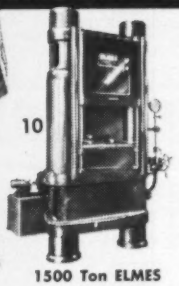
HYDRAULIC PRESSES



9

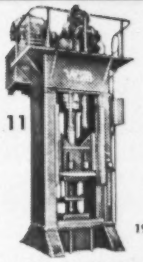
1943

2000 Ton CLEARING
Selling Price **$30,000**
New Price $130,000
Mdl. H-2000-54, Bed 56"LR x 48"FB, 18" Down Str., 64" Open Ht., 250 HP. Speeds (in./min.): 900/600/35. Two presses on orig. foundations. For Drawing, Forming, Piercing, Coining, Hobbing and Blanking.



10

1500 Ton ELMES
1952
Selling Price **$12,500**
New Price $40,000
Mdl. 4477, 12" up-stroke, 33" daylight, 3 post constr., 34½" bet. posts. For Hobbing, Drawing, Forming, Coining and Blanking.



11

1944

350 Ton VERSON
Selling Price **$15,000**
New Price $35,000
Mdl. 350 HD4CT, 32" Down Str., Bed 40"x40", 70" Daylight, 125 HP. Speeds (in./min.): 685/914/76. For Blanking, Forming, Coining and Impact Extruding, Drawing.

8

3000 Lb. "Cece-Drop" HAMMER
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New Price $32,000
Chambersburg Mdl. 30CD, Air or steam lift. Gravity drop forging hammer.

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48x42 WHEELABRATOR w/loader
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48x72 WHEELABRATOR w/loader
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DRILL, SENSITIVE, 26" swing, 3 spindle Leland Gifford hyd., MT on spindle
DRILL, HY. DY, 22" No. 22 1/2 Barnes, box column, 1952
GEAR MACHINERY, No. 5B Sykes, Sykes/Farrel/Birmingham, 1"—6" capacity (3)
GRINDERS, CENTERLESS, No. 2 Cincinnati Filmatic
GRINDERS, CYLINDRICAL, 22" x 72" Landis type C plain, hydraulic
GRINDERS, SURFACE, 20", 25A Heald rotary, hydraulic
HONE, Model 224 Barnes vertical, internal, hydraulic
LATHE, AUTOMATIC, 20" x 37" Fay
LATHE, ENGINE, 25" x 72" Axelson CC, heavy duty, 20 HP, flange MD
LATHE, PRODUCTION, 15" x 30" CC, light carbomatic, hydraulic, heavy duty
LATHE, TURRET, 36" Regers Model IT-36VTL, new 1953
LATHE, TURRET, Model 2H8 Libby hy. dy., saddle type, 8 1/4 capacity
LATHE, "T" TYPE, 60" Lodge & Shipley, right angle, chucking, 1952.
MILLS, PRODUCTIONS, 34/36 Cincinnati Duplex hydromatic
MILLS, BORING HORIZ., 4 1/2" bar universal "Tri-Way"
PLANER, 54" x 42" x 12' Gray, dial feeds, 15 HP MD
PRESS, HIGH SPEED, 200 ton Henry & Wright, air clutch SC die press
PRESSES, S.S. 350 ton Model 40-8 1/2 Minster, air clutch, herringbone drive
SHAPERS, 66" Rockford hy. dy., wide pattern, open side, hydraulic
SHEARS, 3 1/2" No. 30A Hill-Acme "Canton" all steel, right hand alligator
SLOTTERS, 36" Rockford vertical hydraulic full universal, 1945
UPSETTER, 6" Ajax air clutch, 75 HP MD

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We are seeking a highly trained man with executive capacity, and expect to pay the right salary for the right man.

In reply give full experience record and educational background, stating age, marital status and salary expected.

BOX H-149
c/o The IRON AGE, Chestnut at 56th, Phila. 39

HELP WANTED

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Box H-151
c/o The IRON AGE, Chestnut at 56th, Phila. 39

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BOX H-148
c/o The IRON AGE, Chestnut at 56th, Phila. 39

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BOX H-150, care of The IRON AGE, Chestnut at 56th Street, Philadelphia 39, Pa.

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HOIST HOOKS

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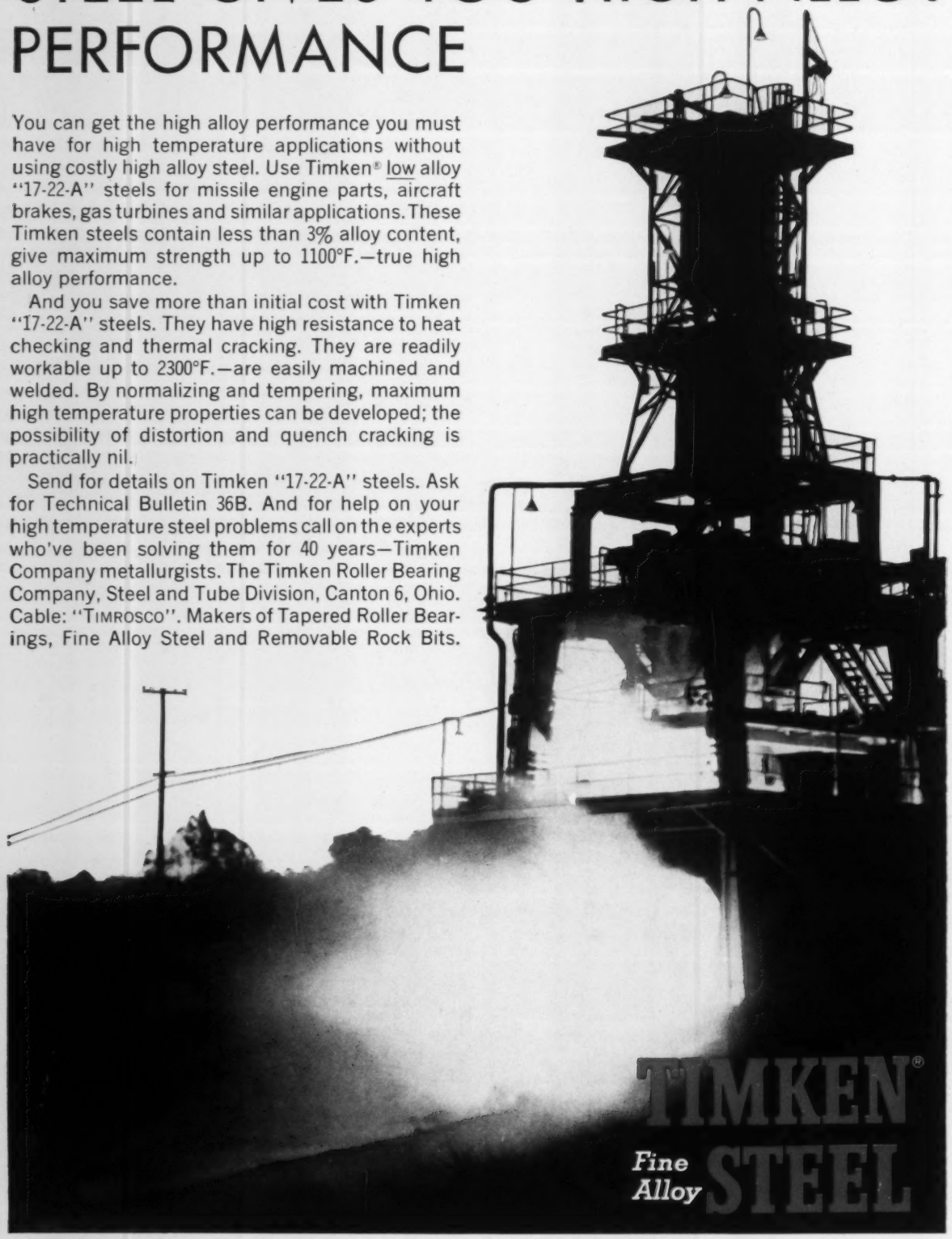
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